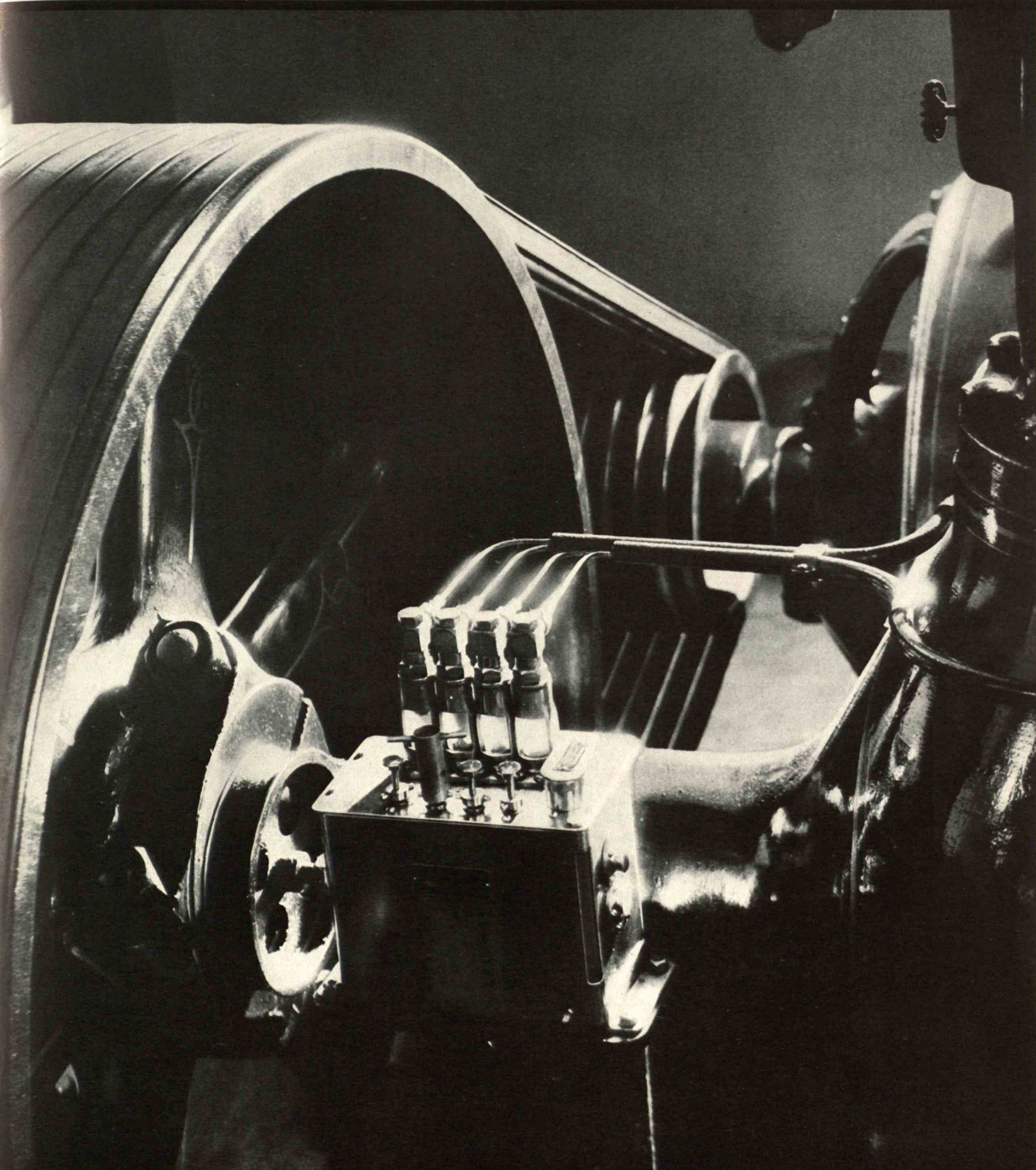


February 1934

TECHNOLOGY REVIEW

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technology review

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A lass and a lack



*No match for
her Chesterfield!*



THE CIGARETTE THAT'S *Milder*
THE CIGARETTE THAT *Tastes Better*

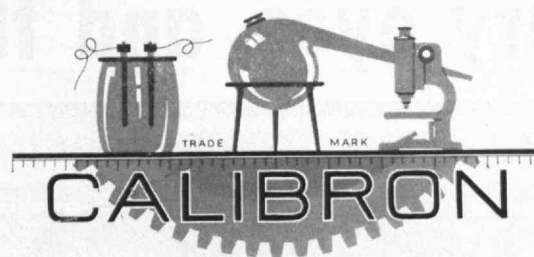
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TOBACCO CO.

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THE TABULAR VIEW

PAGES 177 to 189 of this issue are given over to a symposium on Industrial Problems under the National Recovery Act. The Review does not often devote so much space to one topic, but so much interest was aroused at the Economic Conference at which these papers were originally presented that it would seem to be a public service to put them in permanently available form. Each of the four contributors is identified at the beginning of his paper, but it is appropriate here to give further information. ¶ WILSON COMPTON, brother of President Compton of the Institute, will be recalled by Review readers as the author of the article "Opportunities for Technically Trained Men in the Wood Industries," published in The Review for November, 1931. Dr. Compton has made the National Lumber Manufacturers Association one of the most forward-looking and important trade associations in the country. ¶ ROBERT F. ELDER is a graduate of Harvard University. In March, 1932, he contributed to The Review an article entitled "Industrial Equilibrium." In 1928 he won the Alvan T. Simonds prize for a paper on "Reducing the Cost of Distribution." ¶ FLOYD E. ARMSTRONG holds two degrees from the University of Michigan and has been a member of the Department of Economics at the Institute since 1916. ¶ ERWIN H. SCHELL, '12, in addition to being Head of the Department which sponsored the Economic Conference New Year's Day, is Professor of Business Management, M. I. T., a member of the Corporation of Simmons College, and a former Professor of Industrial Management at the Graduate School of Business Administration, Harvard University.

ONE of the outstanding papers at the recent meeting of the American Association for the Advancement of Science was given by WALLACE B. DONHAM, Dean of the Graduate School of Business Administration, Harvard University. His address was the opening one at a symposium, entitled "The Chemical Revolution," over which he presided. On page 165 The Review presents this address in full. Dean Donham is the author of "Business Looks at the Unforeseen" and "Business Adrift." In its March issue The Review will present another important paper which was presented at this symposium—the one on "Plastics" by Dr. A. D. Little, '85. ¶ E. C. CROCKER, '14, and L. F. HENDERSON are members of the staff of Arthur D. Little, Inc. While in the Chemical Warfare Service, they became interested in odors and have been working together on the subject in the Little Laboratories for over eight years. During this time they have worked on problems relating to perfumes and flavors of all types. They report that liquors have lately come within their scope and interest (in a purely academic way!). ¶ The Review acknowledges with appreciation the assistance given by HORACE FORD, Bursar of the Institute, in the preparation of the article entitled "Everett Morss and the Institute" on page 190. ¶ The information and pictures on page 170 relating to Culture Pearls were supplied by CHARLES H. BAKER, JR.



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PHYSICAL EQUIPMENT

37 years of age in rugged health. No sickness in 15 years. Physical energy to carry peak loads without undue fatigue. 5' 10" tall, slight and wiry. Physical appearance is well-groomed but not impressive (rather neutral).

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Took hold of weak foundry subsidiary in 1922. Turned it over to others in 1927 in strong condition. All done out of earnings.

Since 1927 has been in charge manufacturing, sales and engineering for parent company. Put in budget which enables profit to be made at 25% capacity. Made some mistakes but record will stand examination. Gave 100% support to policies against which he had made vigorous protest but which were passed over his protest.

PERSONAL CHARACTERISTICS

Slow in forming friendships. If given time mixes well. Prefers business relationships to purely social ones. Not qualified for high pressure selling but can get and hold repeat business. Well regarded by associates. Served as enlisted man in World War. Acquired better than average understanding of human nature.

If you need some one to carry some of the more arduous duties for some of your present executives this man should be considered.

If you need an executive to spend his time travelling or to go to some remote post consider this man. He has no dependents so can go anywhere. (If the opportunity justifies.)

If you need new blood this man will bring an aggressive hard-working common sense attitude. He can bring to a large corporation the view of the small tight-knit organization.

His name can be obtained by phoning or writing The Technology Review, (Phone Univ. 6900) or by replying to the following:

Box B, The Technology Review, M. I. T., Cambridge, Mass.

He cut the Belt to pieces before our very eyes, and this is what he said:



**BELTS
MOLDED GOODS
HOSE
PACKING**

Made by the
Makers of GOODYEAR TIRES

THE GREATEST NAME

IN RUBBER

GOODYEAR

HE IS an eminent engineer, and an eminently practical one, too.

His projects, and the installations which he has supervised, are conceded to be the models for the entire industry in which he works.

Talking about conveyor belts, he reached into a drawer, took out an old section of Goodyear Belt that had carried 24,000,000 tons, and with his strong-jawed pliers and might and main (and the aid of a couple of bystanders) tore its plies apart.

You could see and feel and hear the friction rubber between those cotton cord plies holding fast and stretching and finally giving way. He tossed the torn belt section onto the desk, saying:

"I would rather have this old belt right now than many a new one

"THAT'S what you ought to tell the world about Goodyear Belts! Goodyear knows how to send the friction through the fabric so that every individual thread of every cord is impregnated with rubber, so that the carcass never separates and every individual cord carries its full share of the load.

"This section is from a Goodyear Conveyor Belt that has seen seven years of service and carried 24,000,000 tons. Right now it is as good today as many a new belt of ordinary construction, and I'd rather have it."

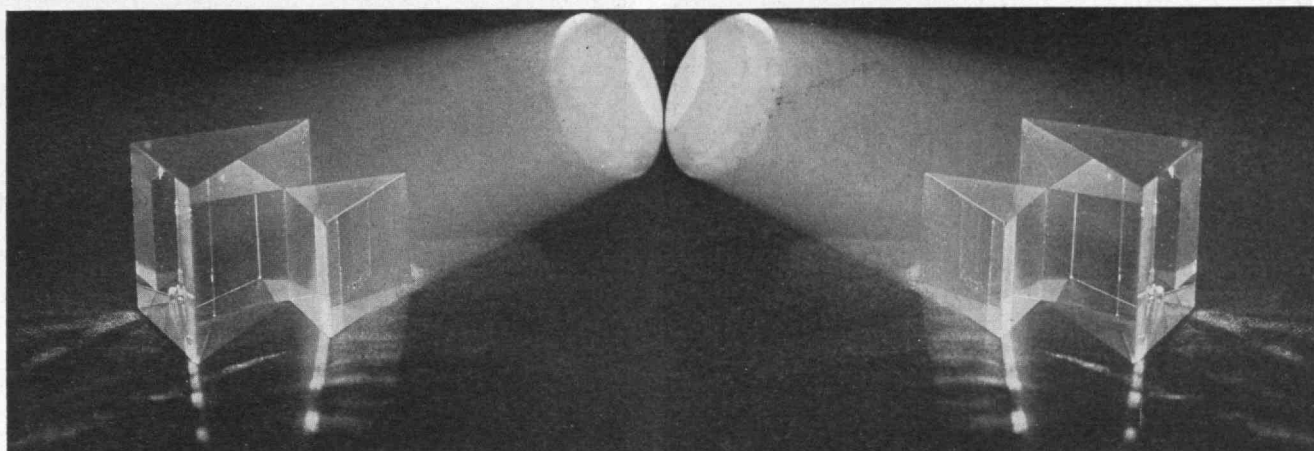
Goodyear Mechanical Rubber Goods are accurately specified to the job by the G. T. M. — Goodyear Technical Man. They do better work, save money, make money for their users. Why not talk with the G. T. M.? Communicate with Goodyear, Akron, Ohio, or Los Angeles, California, or your nearest Goodyear Mechanical Rubber Goods Distributor.



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EDITED AT THE MASSACHUSETTS INSTITUTE OF TECHNOLOGY



John P. Elting, '31



Vol. 36

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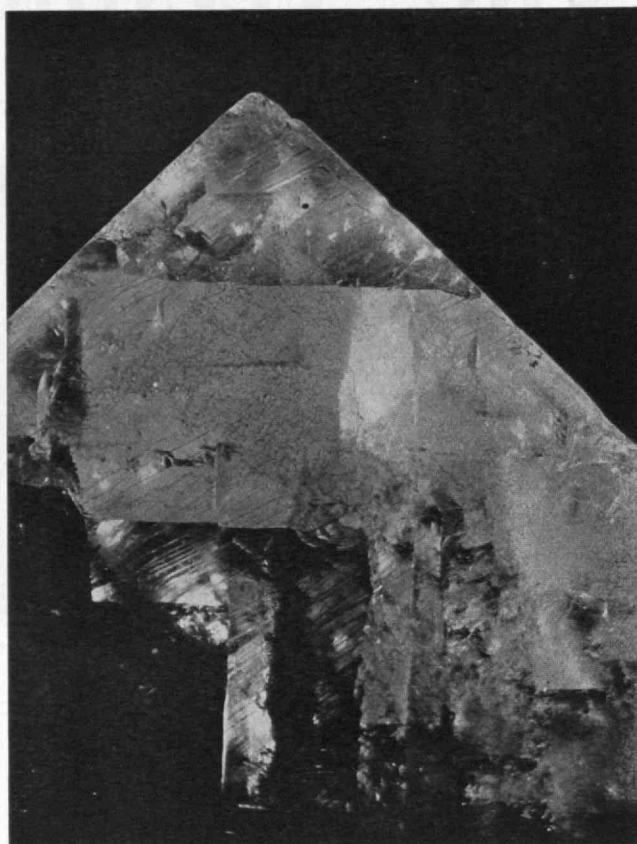
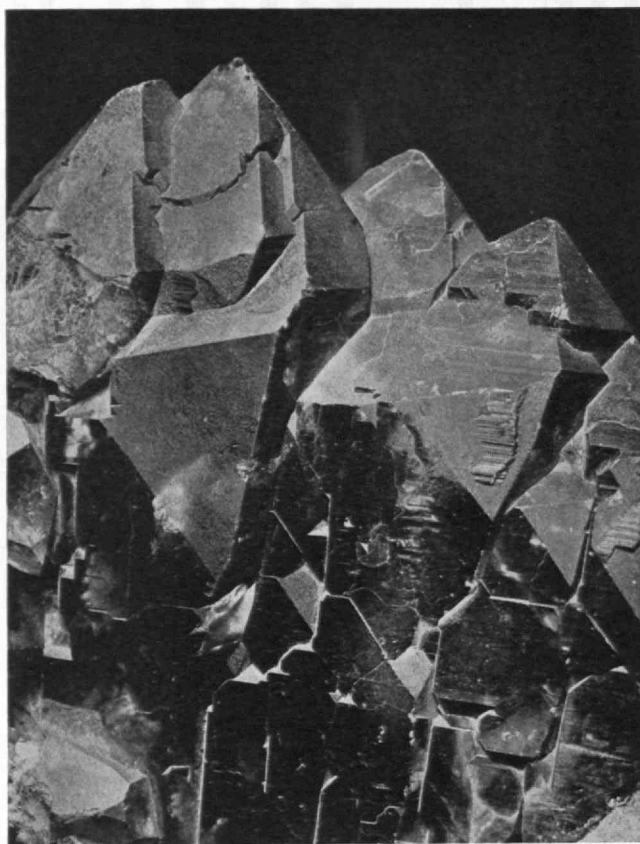
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In the High Sierras of Crystal Land

*Crystal Formations (Mostly Quartz) from the
Economic Geology Collection at M. I. T.*

PHOTOGRAPHED BY JOHN M. SLATER, '32



THE TECHNOLOGY REVIEW

Vol. 36, No. 5



February, 1934

Science in the World It Changes

Security vs. Progress

BY WALLACE B. DONHAM

IT IS a commonplace that the phenomena grouped by economists and students of business under the Industrial Revolution deal, not with a short period of time in the first half of the last century, but with changes which began about a century and a half ago, continue now, and project themselves into the future. The situations which we group in this way are a result of great accomplishments in natural science. They have always been dominated by progress in applied science which, in turn, depends on pure science. For some purposes it is helpful to subdivide this Industrial Revolution into three revolutions in applied science, originating or gaining momentum at different times and presenting different characteristics and results.

The power revolution which began at the end of the Eighteenth Century substituted indefinitely expansive steam power for small-scale, inefficient, local water powers. It stimulated mechanical invention, enlarged the factory system, made possible steamships and railroads, radically changed the relationship of agriculture to other social functions. It created vast division of labor among the nations of the earth. By offering new personal opportunity to men, it redistributed a multitude of people over the earth's surface, increased the points of contact among nations, brought about new relations between tropic and temperate zones which increased the

THREE REVOLUTIONS AND
THEIR SOCIAL CONSEQUENCES
— SCIENCE, THE CONQUEROR
— THE IMPORTANCE OF NON-
SENSE — SLOW PROGRESS OF
SOCIAL SCIENCE — NEED OF
DIRECTING SCIENCE TOWARD
SOCIAL OBJECTIVES—SUGGES-
TIONS FOR RESEARCH PROJECTS

wealth of both, and stimulated the growth of powerful empires. When internal combustion engines arrived, this power revolution displaced animal power by small, mobile power units and gave new freedom of movement to individual men. It brought still further improvements in agriculture and completely changed the highway systems of the civilized world.

On this revolution was imposed an electrical revolution, which facilitated the growth of efficient steam

power plants, reestablished waterpower, made possible wide distribution of power from central plants, and affected agriculture by stimulating great irrigation projects. Beside lighting the world, it gave instantaneous communication by telegraph, telephone, and radio.

Deep in its roots, but more recent in its spectacular effects is the chemical revolution. In its childhood it was principally effective as it revolutionized warfare and, through metallurgy, helped make possible the power and electrical revolutions. Now it uses great quantities of power and electricity in a vast range of processes and products known to you all. In America this chemical revolution, hardly 15 years out of infancy, introduces new processes and products into our industrial structure on a scale which may soon enlarge the material options of mankind faster than either of the other two developments.



Dynamics—Gerald Young

All of these accomplishments represent amazing progress in the effective control of nature for mankind. One collateral thing they have in common. Through changes in material things, they change constantly the habits of living, environment, modes of thought and action of countless people. Collectively, they have brought about a higher standard of living for great masses of men than ever before known. They have put within the reach of well-located industrial nations the abolition of hunger and thirst; adequate provision for raiment and shelter, in old age as well as in maturity. Provided only we can make wise use of the enormous powers placed in our hands, we shall be freed from those great consuming fears which have obsessed mankind since the dawn of consciousness.

But there are other consequences of this advance which illustrate the age-long conflict between progress and security and the difficulty of maintaining social equilibrium in periods of rapid material progress. The power revolution was felt first in England, where it ushered in a century of material progress. Unfortunately, this progress brought great social stresses. A generation of men, without understanding or sense of social responsibility, abused their suddenly attained power. England still suffers from these strains. We avoided the worst consequences of this period because alternative opportunities in an uncharted continent compelled more humane handling of labor. Nevertheless, we, too, still suffer from the disorganizing effects these early changes imposed on a society which could have no understanding of their significance.

THE TECHNOLOGY REVIEW

These revolutions in their social effects go far beyond the factory system. They accelerated the movement of farms to the West and made cotton King in the South. They gave the Northeast substitute occupations when agriculture in that rockbound and hilly area could no longer compete with the great plains. They increased the wealth of the nation, but in doing these things they separated the farmer from his market, made an uncertain business out of a solid way of living, and tangled him in the complex skein of international trade. They kept industry out of the South, complicated the slave question, and increased the difficulties of the negro problem.

By making skills progressively less important, they created an almost continuous shortage of cheap labor and brought on the heterogeneous immigration of races, creeds, and cultures which became so imposing in the last 50 years. The efflorescence of commerce and industry concentrated these new groups in cities. Segments of many peoples mobilized from the ends of the earth, continually shuffled and reshuffled, were given no chance to become one people with normal social contacts. Far too many of our newer immigrants, even to the second and third generation, never secure a real social integration in community life. Indeed, for them there may be no community life. Even in our middle classes it is becoming normal to be born in a hospital; to be educated in many schools with changing associates; to live in a succession of apartments in a variety of cities, never tasting the values of life in a home fixed to land and to neighbors; only to die in a hospital and be buried in a grave unknown to and unoccupied by their ancestors. The neighborhood is destroyed as a social unit. Old social controls break down. If immigration had come more slowly or if our communities had stayed smaller, we might have preserved the integrity of existing social groups and controls while processes of assimilation could go on, but change was too rapid. The older groups in the cities are overwhelmed with numbers and our cities are agglomerations rather than societies.

Meantime, great inventions save human labor on a scale which creates a new type of technological unemployment and intensifies all unemployment problems. Instead of realizing security as the fruit of progress, the most ancient fears of mankind revive. Countless individuals have lost social stability and a normal social life. The fear of hell fire and damnation in the world to come no longer dominates mankind, but insecurity and loneliness make the world a living hell for increasing numbers. Multitudes have lost faith and with it a sense of purpose in life.

The impact of material progress has lessened, destroyed, or prevented the development of social customs and controls which alone enable mankind to live as a social animal. Our researches in industrial relations indicate the serious effects on both production and morale which follow on such simple things as changing the seating in a room and thereby breaking down the accustomed social contacts among individuals at work. We have moved millions into the unknown without reestablishing them in social units. Is it any wonder we miss individual thrift and piety, neighborhood interest and responsibility, old-fashioned personal stability?

In efforts to secure substitutes for neighborhood responsibility and social organization, we are driven more and more into centralized political controls. As these problems are forced on central governments, international efforts for peace and harmony break down. Instantaneous communication causes more friction than it stops. Efforts to confine problems within national borders increase. National loyalties grow of necessity, for the only hope of securing a degree of social stability compatible with continued progress is through national efforts at self-control. Here is one of the greatest reasons for the growth of economic nationalism so deeply deplored at Geneva.

Can these rapid processes of change be kept from upsetting our whole structure? If so, science gives complete assurance of continued progress in material things and of the leisure out of which we may develop a great civilization.

Conflicts between security and progress are always present. The point is that less than 200 years of applied science, just because they brought great progress, have brought great instability. This instability threatens to destroy civilization. It is not a time for despair, nor is it time to stop the quest for knowledge. Rather is it time for sober thought and plain speaking; for wise direction of progress toward increased knowledge. We need the combined efforts of many groups, particularly in the universities, to bring about social and economic stability. Otherwise our unplanned activities will increase the stresses and strains on an already unstable nation and civilization.

If I appear to emphasize the disturbing consequences of scientific progress, I beg that you credit me with the intention of being constructive. If later I emphasize the responsibility of the scientist, you will find reason for this emphasis in the fact that I am addressing scientists and engineers and not assume that I seek an alibi for the group to which I personally belong. In an address* last year I dealt with the collapse of business leadership and the responsibility of universities for this collapse. I assure you I was no less frank and rather more critical in that address than I am now.

WHITEHEAD, in "Science and the Modern World," ends his epic story of a great adventure in thought with these words:

The great conquerors, from Alexander to Caesar, and from Caesar to Napoleon, influenced profoundly the lives of subsequent generations. But the total effect of this influence shrinks to insignificance, if compared to the entire transformation of human habits and human mentality produced by the long line of men of thought from Thales to the present day, men individually powerless, but ultimately the rulers of the world.

Should we not inquire why the great conquerors failed to do more? It is characteristic of conquests that, despite every effort of the conqueror to assure the permanency of his accomplishments, his direct objective even when attained is quickly overthrown. Only indirect and secondary effects have permanent importance.

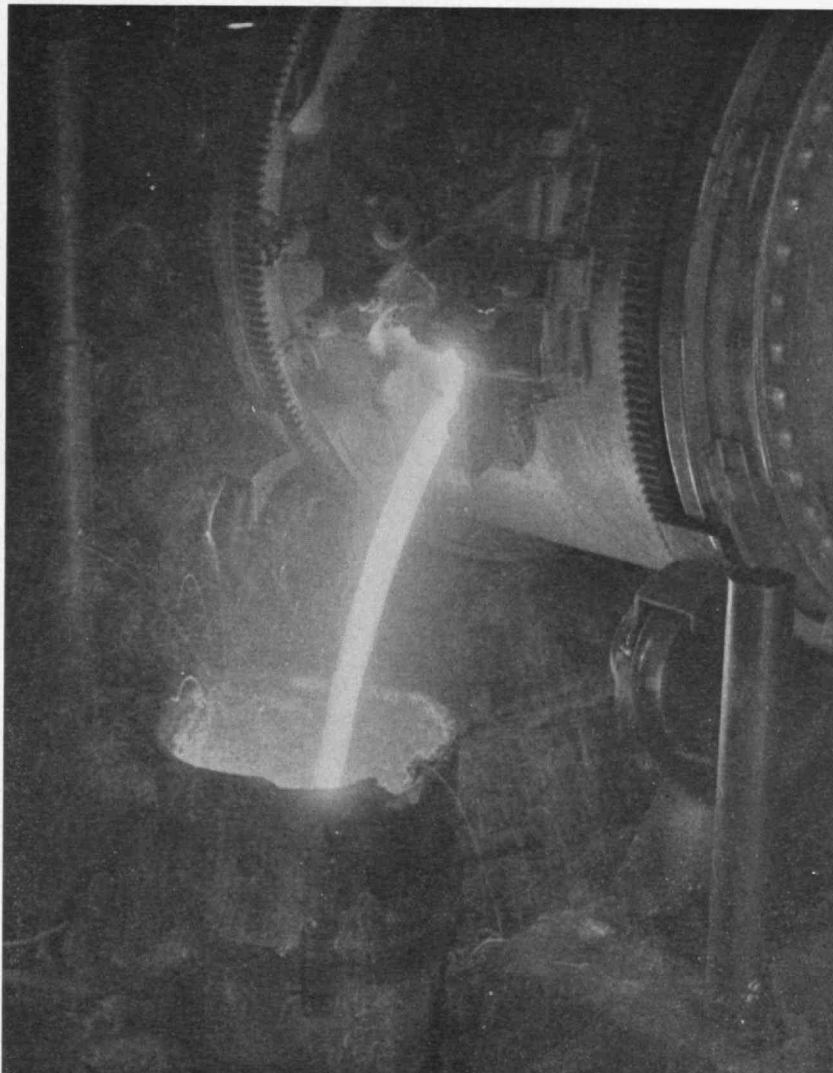
*The Failure of Business Leadership and the Responsibility of the Universities, *Harvard Business Review*, July, 1933.

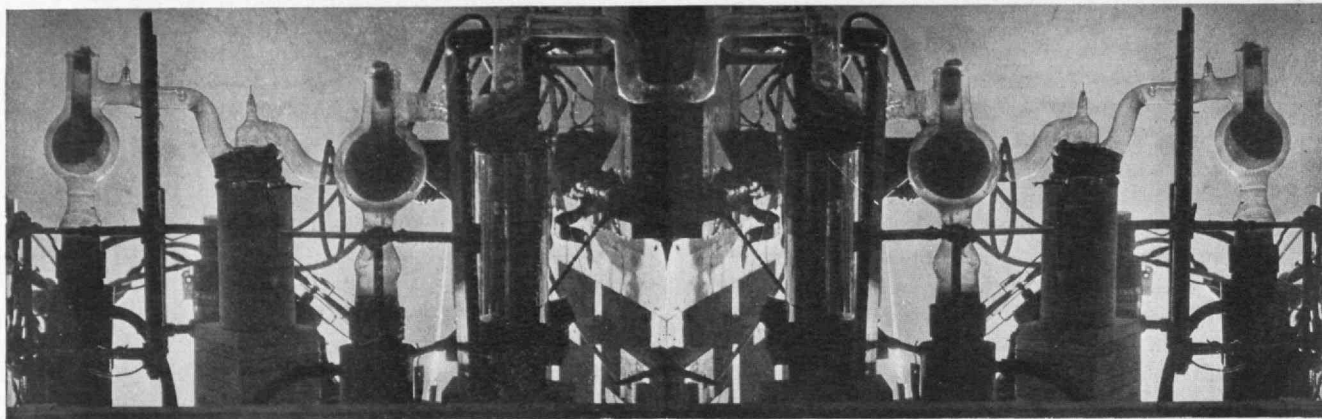
Yet it is characteristic of conquerors that they start out to accomplish things worth while in the general interest. Napoleon's empire fell during his lifetime, but his social programs still color the whole organization of France. Unfortunately as success gives assurance and power stifles criticism, the Alexanders, Caesars, and Napoleons become more and more self-centered, more and more oblivious of the position and interests of other individuals, social groups, and nations. Despite the fact that no man can for long wield great autocratic power with balanced social wisdom, Power becomes their God. Thus, they bring their own destruction. The defeat of their dearest ambitions comes through the opposition of individuals and groups of segments of their own followers as well as of conquered peoples. No one likes to have modes of thought and habits of living imposed from without. Alogical and nonlogical sentiments upset the most carefully conceived plans of empire.

Such conquests are always followed by long periods of readjustment. The social forces let loose by the conqueror settle slowly into some new moving equilibrium with other social forces in the society affected.

Is it worth mentioning these characteristics of great conquerors, for if Whitehead's summary approximates truth, science — meaning thereby the natural sciences — is the present day conqueror. There is imperative need that this new conqueror avoid the errors of great conquerors of the past. Like human conquerors, natural science has by its own success become self-assured and self-confident. Science is the conqueror; its God, The Increase of Human Knowledge.

Pouring a Heat—Gerald Young





Gaede vacuum pumps as used to exhaust a vacuum spectrograph — photographed by John P. Elting, '31

Most scientists assume that increase in knowledge is intrinsically and inevitably good. Others, a little more objective but still without vision or understanding of the complexity of social problems, conclude that failure to keep it good is the fault of personal devils outside the scientific group. Usually they blame business men or politicians, believing that they should and in time will be exorcised by the incantations of the high priests of pure science and the vast chorus of the faithful in applied science and technology. Natural science prides itself on the impersonal and objective nature of the Increase of Human Knowledge and as a consequence makes little effort to study the hopes, fears, and needs of humanity. It does its duty, as it sees it, when it adds to our grasp of natural laws and multiplies the options open to mankind in the use of material things. It forgets that at least in the western world the God of the Multitude must always be a personal God, responsive to the hopes and fears of His people. The case for the goodness of Human Knowledge Increased through the natural sciences is far from established. In my opinion, it is unlikely to be established unless the search for knowledge is socialized, much as the Jehovah of the old testament was humanized by Christianity.

Science looks at its vast accomplishments and at huge, unconquered areas ahead. It recognizes that what has been done is a small beginning. Scientists are humble before the great God of Knowledge. So long as they leave untouched the great questions arising out of the impact of scientific accomplishment on the social organization of civilization, do they not by that fact arrogantly assert that there is no God but Knowledge and that science is Its handmaid?

Science is self-centered. Too often it assumes that the logic of natural science is the universal logic. One sees repeated statements that social jobs would be done better if left to engineers, that leaders in other social groups are incompetents who do their tasks on a reprehensibly low level.

Science assumes that social science could, if it would, progress by building brick on brick. The quicksand of uncertainty in the world of social relationships is forgotten. There is little realization that scientific logics developed under conditions which allow isolation and control of individual variables furnish no foundation for social sciences. There is no general understanding of the logical and practical limits within which we must ap-

proach deep sentiments and emotions. It is forgotten that the human race evolved without a logic for countless years and that since systematic thought began, it has used its logics mainly to rationalize hopes, fears, loves, and hungers; its social forms as modes of achieving the good and exorcising the evil.

The failure of science to take into account these deep-seated emotions, indeed its habit of brushing them aside as on a lower level of activity; its failure, in a scientific colleague's phrase, to understand the value and importance of nonsense is amazing lack of perspective.

One hundred and fifty years of science has introduced new variables into our western society more revolutionary in its effects on individual men than everything since the establishment of Christianity. Nothing in the history of the race equips it for dealing with change on this scale of time and magnitude. We forget that the limitations on human capacity, the emotions, the sentiments, and the habit of rationalizing logics which enable men to live socially do not change in any such moment of time as 150 years. The great conquests of the past have been followed by long periods of adjustment in which the world sought new balance. Just so, unless science, the conqueror, with greater wisdom than the conquerors of history, definitely does its part with other social groups in seeking balance now, a like period of rest from the conqueror and slow adjustment will be essential. During such a period, science will be dethroned and imprisoned. Science cannot wait for its conquest to be complete. It must adjust itself to human nature.

IN ITS impatience at the failure of social scientists and practical administrators to make faster progress, science forgets the long centuries between Plato and the Seventeenth Century, when scientific progress was dependent on a handful of geniuses like Aristotle, Galen, and Copernicus and wholly lacked continuity. It overlooks the many years when the concept of perfection with its corollary acceptance of the circle, stopped observation and progress in astronomy. Chemistry forgets that the accidental observations of alchemy turned into organized progress 150 years later than a corresponding beginning was made in physics; that it waited those long years for a technique of isolating and studying quantitatively the characteristics and behavior of gases. Social science may never learn, as a

colleague phrases it, similar quantitative methods of studying "hot air", though sentiments and emotions are as important to the effectiveness of social science as gases to chemistry.

When, as in many aspects of social problems, quantitative measurements are impossible, alternative modes of approach must be worked out. So far as I know, it is only recently in biochemistry and physiology that chemistry itself has tackled the great difficulties involved in the simultaneous study of many variables all in a state of flux. Great logical difficulties must be solved in such subjects as well as in the social sciences but in the latter field the difficulties of measurement are far greater. Social science makes little progress by considering in isolation one factor like demand on the false assumption that supply will remain static; nor can it isolate economic problems from administration and politics at the stage where policies must be determined and carried out. Continued intellectual progress in the natural sciences is simplicity itself compared with the complex problem of understanding and controlling wisely the novel social forces, stresses, and strains loosed on a world of sentiment and emotion by the progress already attained in these sciences. The superior attitude so often adopted by natural scientists toward their colleagues in social science and toward men of affairs who seek stability and progress in business and politics has no justification. It ignores the immensely greater difficulties they face.

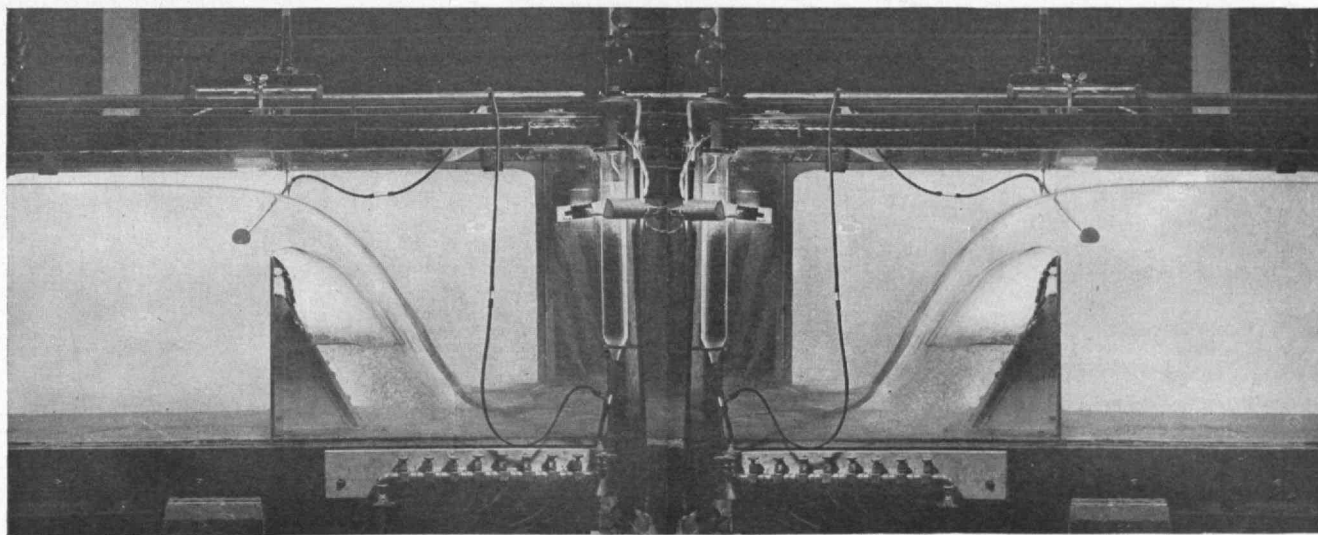
When scholars and practical men face such difficulties, it is no alibi for science, the conqueror, that others are responsible for making good use of knowledge. Rather, under such circumstances, it is the responsibility of science to minimize the difficulties it imposes on social science and administration. The direction which increase of knowledge shall take is of first importance and a large part of that problem of direction is within the control of science. Workers in natural science have almost unlimited fields from which they may choose where to direct their abilities. At best they will add new social stresses, but at best also they may relieve great social problems and simplify the tasks both of students of society and of practical administrators.

The direction of scientific effort should not be left

to the chance untutored choice of individuals or, through industry, to the specialized profit opportunities of the moment. Chemistry in particular, like technology in general, has accomplished so much foundation work that large elective areas are well plotted out. It is no longer necessary to grope experimentally in complete darkness. Considered scientific objectives can be defined which offer hope of socially constructive progress.

Chemists owe to society, and to the continuity of the search for knowledge, even in their own field, the obligation to discover and select such lines of attack. Thereby they may alleviate rather than increase strains. The present emergency is greater than the Great War. Indeed the Great War was a part of this emergency. We need the same kind of devotion to public service we then had from administrators and scientists alike.

This is not a suggestion that chemists become economists, business men, or politicians. The job of understanding social problems will never be the direct job of the natural scientist. Humble before the vast expanse of the unknown and with full realization of the necessity of specialization and its limitations, they should keep a complete understanding of Whitehead's thesis. They will, so long as they remain scientists, be individually powerless. Science is the conqueror, not scientists. The cumulative work of scientists through the power of science to influence thought, habits, and environments should rule the world. Individually scientists must remain powerless. But as individuals they should not forget that rulers throughout history have been more often bad than good. The ultimate rule of science may easily be interrupted for centuries if science continues to have the defects of the conqueror. The skillful ruler strives to relate his rule to the hopes, aspirations, emotions, and sentiments of his people. The wise ruler seeks balance, which includes stability as well as progress, knowing that progress is conditioned on stability. The analysis of social factors will always be the work of social scientists and practical administrators. The scientifically trained man is not equipped by training to make himself into an economist, a social scientist, or a political adviser. When he (*Continued on page 196*)



In the Hydraulics Laboratory—a photograph by Hunter Rouse, '29



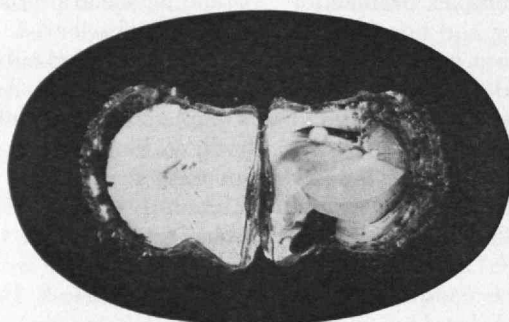
The divers are all girls and they work in 30 to 40 feet of water. The young oysters they bring up are dropped in large, floating wooden tubs. The eyes of the divers are protected by water glasses



Introducing the nucleus into a living oyster. This nucleus is a spherical bit of mother-of-pearl. The Japanese men who perform the operation of inserting it are unbelievably deft

CULTURE

Working Three



PEARLS

Million Oysters

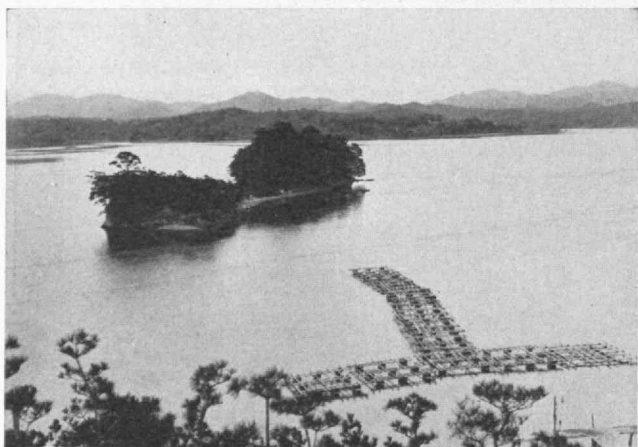
THE adjacent pictures were taken on the watery plantations of Kokichi Mikimoto, "the Pearl King," where pearl oysters are caused to produce fine pearls through a controlled system of minimized variables.

The first step in pearl producing is to plant the young oyster spats in favorable and sheltered waters. After these young oysters are four years old or so, they are gathered from where they rest in 30 to 40 feet of water and placed in tubs by girl divers. They are then sorted, graded, and placed in baskets, properly tagged with their dates and other special information. They are now

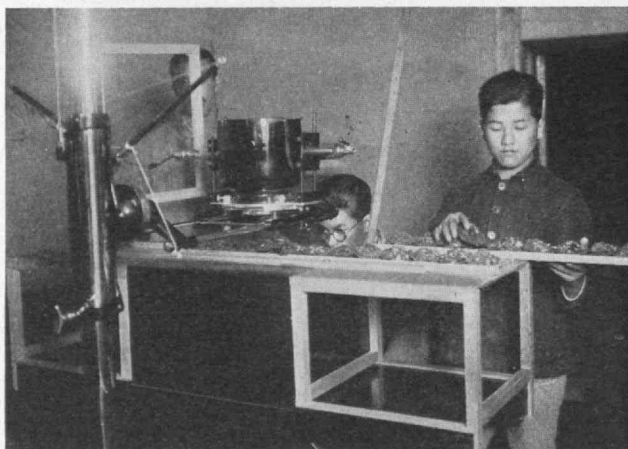
ready for the delicate surgical operation necessary to introduce the bit of nucleus into the tissue of the young oyster. The incision is made in the tissue of the living oyster and into this incision is placed the nucleus, wrapped in a sac of live tissue from another oyster and tied with the finest of thread. This nucleus is a spherical bit of mother-of-pearl or a seed pearl not much larger than a pinhead in size.

Now ready for their working period, the oysters are placed in heavy, steel wire cages and put back into the water again to remain for seven years. At the end of this period, the oysters are lifted and the pearls removed.

One of the huge rafts supporting the cages containing some of the three million pearl-bearing oysters



A fluoroscope makes it possible to tell exactly which oysters contain pearls



THE TREND OF AFFAIRS

Whiff Numbers

By E. C. CROCKER AND L. F. HENDERSON

IT IS hardly necessary to reflect that our only avenues of contact with the world about us are our five senses: sight, hearing, touch, taste, and smell. Without the first three, life would be extremely difficult, if possible at all. The latter two, while presumably of great importance to our less-evolved ancestors, are hardly essential to our existence today, but are the source of much pleasure.

Taste has its receiving station principally on the tongue. Sweetness "buds" are most crowded near the tip, while saltiness and sourness buds are scattered along the sides. The presence of a large proportion of the bitter-receptive buds toward the back of the tongue accounts for the higher pleasure a beer devotee gets when he tilts his head back and gargles the hops-bitter, amber fluid.

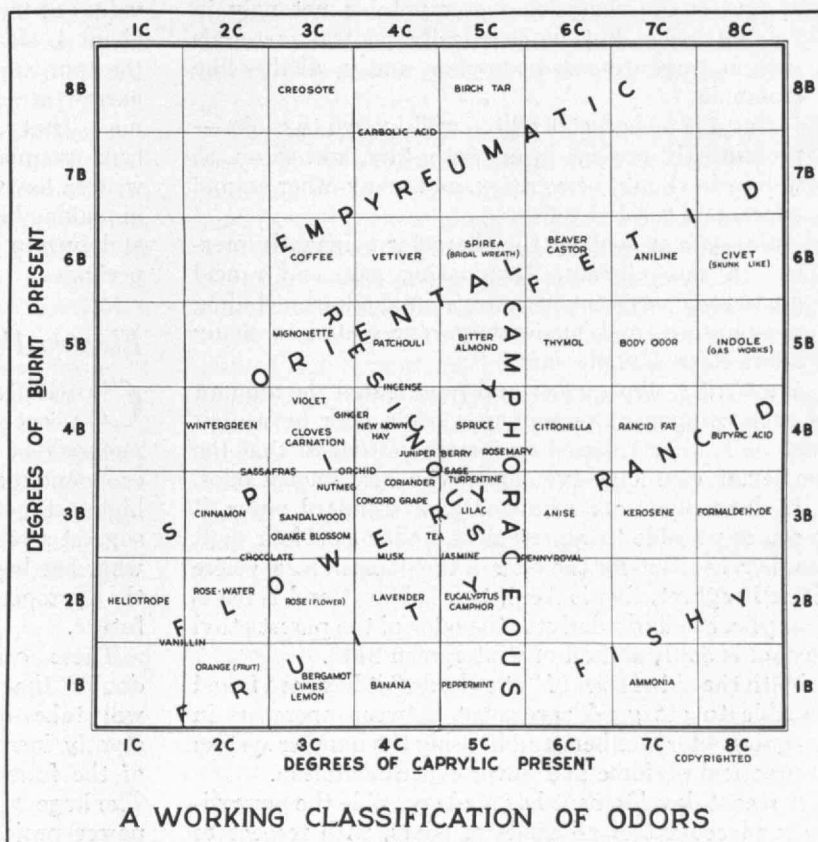
Much of the pleasure that we ascribe to taste really originates with that less-esteemed sense, smell. Few fruits or vegetables have more than a slight sweet and sour taste. Without the sense of smell, apples, celery, onions, and even garlic all taste about alike. Flavor is a more descriptive term than taste, and takes in not only what the tongue detects, but also the aroma which enters the nose by its back door, just above the throat, and impresses itself on the sense of smell.

Attempts to classify odors into their components have not been as easy as they were in the case of taste, where experiments could be made directly on the tongue. It has been necessary to depend upon subjective values, such as odor impressions, for no technique has yet been worked out by which we can reach up the nose to the smelling area, under and back of the eyeballs, to study the phenomena in a thoroughly experimental way. Possibly some kind of electric nose will be evolved which may make the attack on the smelling area itself unnecessary.

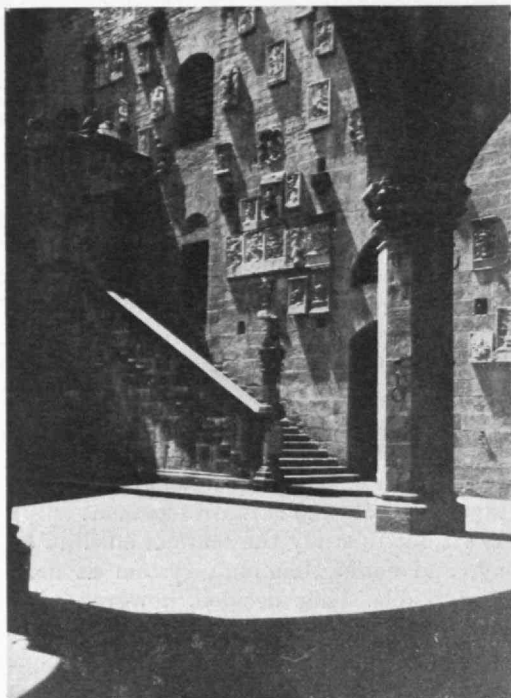
Working subjectively, Linnaeus, followed by Zwaardemaaker, decided that there were nine odor classes: ethereal, aromatic, balsamic, ambrosial, alliaceous, empyreumatic, repulsive, and nauseating. These classes were not necessarily components of odors, but kinds selected with a view of making description and classification easier and more exact. Several other workers have extended this type of classification, especially to include the odors of the

chemical laboratory as well as those of nature. Others were more fantastic and poetic and at least one author devised a system wherein odors were spaced by intervals, and had octaves, after the analogy of a musical scale. The German experimenter, Henning, decided that there were probably only a relatively few kinds of smell nerves, each responding to a part of each odor more or less as the taste buds in the mouth do to true tastes. He decided that there were six fundamental concepts or odor components: spicy, flowery, fruity, resinous, burnt, and foul, and did an immense amount of work in classifying odors of all kinds according to this arrangement.

The writers set out to study the sense of smell in an academic way, and chose Henning's system as most plausible and workable. They decided, however, after many experiments, that that system did not express fundamentals as well as it might, although in principle it seemed correct. The final result of their work was a system even simpler than Henning's, which was described in the *American Perfumer* in August, 1927. This system is premised upon the existence of only four kinds of smell-sensation nerves in the human nose, detecting Fragrant, Acid, Burnt, and Caprylic components.



Odor chart embodying classification system described in adjacent text. In order to express odor relationships on this two-dimensional chart, the authors have located various common odor types by the two odor-components generally most characteristic, Burnt and Caprylic. Adjacent odors as shown in some cases have widely different fragrant and acid components.



Borghese Palace, Florence



At Mistra — looking over plains of Sparta



Off the Dal

Photographs from an

By Professor William Emerson, Dean

Fragrant is strong in the odor of most flowers, spices, and fruits, and in some animal secretions such as musk, ambergris, and civet.

Acid is the sharp character notable not only in volatile acids, but in chemically neutral materials such as turpentine and camphor, and in alkalies like ammonia.

Burnt is a character all too well-known to cooks — prominently present in creosote, tars, and so on, as well as in skunk, beaver, fox, and many other animal odors, and roasted coffee.

Caprylic or goatly is the character poignantly present in rare cheeses, illuminating gas, and rancid grease, very evident in many animal odors, including perspiration, and moderately represented in many odors classed as pleasant.

We went a step further and represented the amount of each component present in a given odor by a digit such as 1, 4, or 7, based on 8 as the strongest that the particular character ever attains in any known odor.

If these digits are arranged in a standard order, it becomes possible to represent any odor as a four digit number, as: 6523 for the odor of the damask rose, where six is *Fragrant*, five is *Acid*, two is *Burnt* and three is *Caprylic*. Similarly derived, the odor of the purest ethyl alcohol is 5301, and oil of wintergreen 8442.

With the aid of a set of "standards," it has been found possible to get good agreement between operators in assigning odor numbers and in using the number system in practical perfume and flavor experimentation.

A recent development has made possible the approximate placement of all kinds of odors, with respect to each other, on a single plane chart (see page 171). This is possible since a large proportion of the odors one is interested in have nearly equal *Fragrant* and *Acid* values, respectively, but may vary widely in their *Burnt* and *Caprylic* components, which, consequently, define the

odor characters. In this chart the odors are placed with respect only to their *Burnt* and *Caprylic* components, but this is fairly accurate, since the *Fragrant* values of most odors are about 6, and the *Acid* values about 4. Having built such a chart, we were struck by the approximate placement of all the flowery odors in a narrow area, and similarly, the placement of the resinous, fruity, and other odor types, as shown by the type groupings. It is hardly necessary to note that the writers have found it of great convenience and utility in making blends, shading away from unpleasant types, and even in locating accent or contrast notes for use in perfumes.

Electro-Farming

CURRENT discussion of agricultural problems and a recent symposium at Technology on engineering methods of assisting the farmer in his struggle for economic security and a higher standard of living suggest a brief survey of what has been done and the prospects for the future.

There can be little doubt that electricity will take over a constantly increasing share of the farmer's burden. The huge Muscle Shoals power project is on its way to completion, Boulder Dam and the Columbia River power system are under construction, and the great



Underwood & Underwood

Charles G. Abbot, '94, Secretary of the Smithsonian Institution, examining a new filter for studying effects of colored light on plants



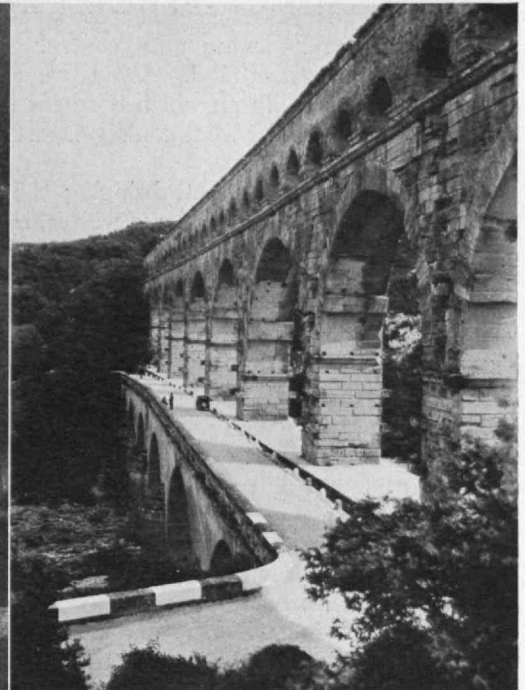
matian Coast

Architect's Album

of the School of Architecture, M.I.T.



Pavilion at Medinet Abu, Egypt

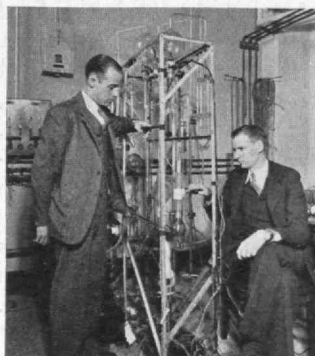


Pont du Gard, France

St. Lawrence River power development, with its promise of cheap power for the Northeastern States, is in prospect. Meantime, existing power companies are looking eagerly for new markets for electrical energy.

The way to electrification of the American farm, however, is not altogether a simple one, for distribution of power in sparsely settled agricultural districts requires expensive transmission lines. This problem may be solved sooner than it is expected by new methods of power generation and distribution. Economic considerations, the saving in labor, increases in crop production, convenience, and higher standards of living will in the end influence the use of power on the farm.

England's huge power network, known as the Grid, a national distribution system (The Review, January, 1934), will bring electricity to thousands of farms at rates which will enable the farmers to make use of it. Electrical energy is also being widely used in agricultural districts of some European nations, but in this country of great distances the problem of distribution is more difficult.



M.I.T. Photo

E. S. Lamar and Overton Luhr and their new proton source, developed in Technology's Physics Department. See January Review, p. 140

Of the six and a quarter million farms in the United States in 1930, approximately 850,000 had some form of electrical facilities. Two years later the number had increased to a million, which, in the light of urban electrification, is surprisingly low. Progress in the application of engineering methods to agriculture, however, is likely to be

more rapid from now on, for farmers as a group have been slow to discard the methods of their forefathers for "new fangled" machines. The increasing use of such devices as cream separators, milking machines, incubators, poultry house lighting, washing machines, and radios indicates a general awakening to the value of labor-saving devices.

The farmer with the means to purchase them already has at his disposal an amazing variety of machinery for many purposes. They include drainage machines, stump pullers, and rock crushers for the reclamation of land. For the preparation of the soil and for planting, cultivation, harvesting, and marketing, he has facilities to meet almost every requirement except weather control.

The internal combustion engine, driving tractors, pumps, harvesting machines, and cutting wood and fodder still bear the greatest part of the mechanical burden on the average farm. It has, perhaps, made its greatest contribution as the power plant of tractors, including the heavy machines for gang ploughing, and the new light and quickly controlled types which now make mechanical cultivation of many crops possible. Electrically driven tractors have made their appearance, but it is likely to be some years before they displace the gasoline engine from its well-earned place on the farm.

Crops of the future may be stimulated by high voltage currents, for experiments show that such currents in the form of discharges from a network of wires arranged above plants increase the rate of growth. Currents of from 20,000 to 60,000 volts and low amperage have been successfully employed in research in this field.

The use of electric lighting to increase egg production on poultry farms is already well known. By periods of artificial lighting in the dark hours of the morning and evening, hens are encouraged to continue foraging for food, thus increasing their storage of egg-producing

substances. The most efficient of these systems of lighting not only includes astronomical control to follow variations in the length of daylight, but provides artificial periods of twilight during which the hens instinctively compose themselves for what poultry experts assert is an ample night's sleep.

Artificial ultraviolet light, bringing the benefits of sunshine during the short days of winter, maintains the health of livestock and makes it possible to rear young pigs at a time when lack of sunlight may cause rickets. Young stock is thus prepared for marketing much earlier than at present, at higher prices.

The increasing popularity of electric household refrigerators on farms has far from exhausted the possibilities in a field which greatly extends the prospects for keeping certain perishable fruits and vegetables, as well as meat and dairy products that under ordinary conditions must be marketed as soon as possible. Some large American orchards already maintain their own refrigerating plants and are able to market their fruits at seasonal price advantages.

Lights, both incandescent and arcs, accelerate the germination of seeds and stimulate the growth of market garden crops and other plants in greenhouses. Ultraviolet light is being used successfully for special purposes, and experiments with other lights indicate that changes in color influence plant growth.

The up-to-date farmer, who can afford the equipment, no longer needs to wait for "good haying weather." The ventilating engineer and the bacteriologist have jointly given him an artificial means of preparing his crop for storage. This method makes it possible to harvest hay when it is in the best condition. Electric

fans force air through circulating channels in the stored hay, inducing a bacteriological rather than a drying process which cures the hay rapidly. Control of temperature, which is important in the making of silage, is now possible by means of electrical methods of heating.

A system of electrical soil heating, which is expected to be cheaper and already has proved more satisfactory than manure for hotbeds, promises much for the development of market garden crops on a large scale. Lead-sheathed cables carrying a wire heating element insulated in asbestos are laid a few inches beneath the surface of the soil, and the heat is regulated by hand or by thermostat. This method is being used extensively in the propagation of early vegetables, for rooting flowers, and for stimulating the growth of evergreens.

In the cranberry bogs of Massachusetts, the ravages of insect pests have been reduced by the simple expedient of placing bright electric lights high above the plants. Beneath each light is a pan filled with oil. The insects are attracted by the light and so flutter into the pans that they must be emptied several times a night. Other and more complex electrical systems of combating insect pests are being studied.

Wings over Everest

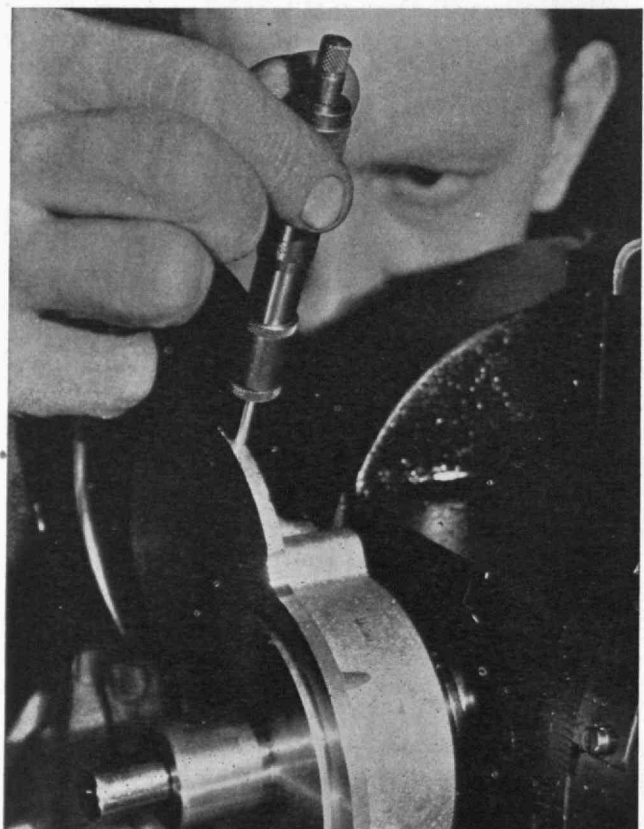
TWO recently published books afford their readers an absorbing contrast between the romantic and the scientific approaches to the high adventure of mountaineering. The German-American expedition to Nanga Parbat in the Western Himalayas¹ was the most recent of the long line of stirring assaults, on foot, of the great peaks, and like most of the others, failed. The Houston-endowed British flight over Everest² in the spring of 1933 was one of the first serious efforts to use the plane in supreme mountaineering and, augur of success in the future, succeeded.

The story of the attack on Nanga Parbat makes thrilling reading for anyone. It has all the elements of drama, for here one finds humans in life and death conflict with elemental things. Any expedition of this magnitude is naturally staffed with eminent climbers but in this case, in the person of the American girl, Elizabeth Knowlton, there was also an articulate mountaineer who had the ability to describe in graphic words the sensation of beauty and grandeur that most climbers must leave unexpressed. The slow toil toward the goal, the final failure, all appear in full stature. None-the-less, when the account is compared with the blunt story told jointly and somewhat naively by Fellowes, Blacker, Etherton and the Marquess of Douglas and Clydesdale, it becomes clear that Miss Knowlton and her companions were the true amateurs of the mountains; the British fliers and observers, the true professionals.

Every recent foot expedition to the higher peaks has made a bow to science. There has been much talk of the observations to be made and the mapping to be done.

¹ "The Naked Mountain" by Elizabeth Knowlton. \$5.00, 335 pages (illustrated). New York: G. P. Putnam, 1933.

² "First Over Everest," by P. F. M. Fellowes, L. V. Stewart-Blacker, P. T. Etherton, and the Marquess of Douglas and Clydesdale. \$3.50, 269 pages (illustrated). New York: Robert M. McBride and Company, 1934.



Precision in Industrial Practice

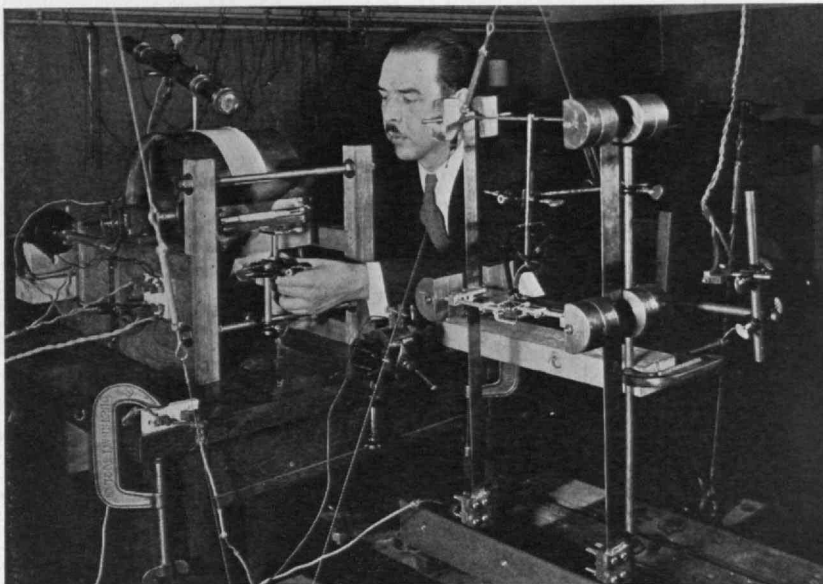
But this only serves to conceal from the unromantic the true motive of the climber, which is to struggle against and conquer danger and difficulty. The coolies of the Nanga Parbat dash could never understand the motives of the climbers and, by the standards of hard common sense, they were right. In the last terrible stages of an assault on foot, the only problem of the climber, and it is problem enough, is to get his worthless body to the top. Were he physically able to carry the paraphernalia necessary to make scientific measurements, he would never be able to muster enough strength and detachment to make them. Such scientific problem as remains is purely one of personal physiology.

In contrast, the air expedition permits the flier to carry cameras and other instruments, to observe in relative comfort what happens, to repeat a visit if need be, and to develop a conception of the terrain as a whole, utterly impossible to the man on foot who comes to regard the entire mountain as one isolated and threatening ridge which day by day becomes a more personal and virulent enemy.

Everyone is, by now, familiar with the spectacular photographs of the Everest flight which have been published in the last few months — pictures that are probably the supreme accomplishment thus far in mountain photography. Everyone must have, too, some idea of the dangers run by the fliers and observers. But as one reads the story of the expedition the dangers and the brilliant oblique photographs appear of less importance and science becomes the chief protagonist. If ever in mountaineering the research attitude was applied and consistently maintained, it was in this expedition. In time the accumulated scientific data will be published. For the moment the scientific aspects of the preparation are of first significance.

These fliers intended to rise in three-quarters of an hour from approximately sea level to an altitude of 30,000 feet, sufficient amply to clear Everest. They intended to do mapping by aerial photography beginning at a point where the land attained 19,000 feet. Their problems of equipment then centered around the necessities of the flight and those of the photography. In the last analysis the latter were the greater, for there has been considerable precedent for high-altitude flying with its consequent difficulties of breathing and keeping warm. The additional complication not encountered by previous fliers to high altitudes lay in the weight of photographic equipment. Flying to these heights involved difficulties for machines and men.

Should light vegetable oil be used instead of heavier mineral lubricant? How could the oil be kept cool? Of course the temperature would be low but the air at 30,000 feet would have so little density as to have few molecules to carry off heat. The plane ought to be streamlined but photography demanded an open cockpit. This last difficulty was resolved by making doors



New instrument for recording directly the stresses set up in model structures by artificial earthquakes. See following page

which normally streamlined the cockpit but could be released for photographic work. Practically every flying instrument ultimately represented a deviation from normal.

Physiological problems were even greater. Climbers on foot have lately given up the use of oxygen because they go through months of acclimatization, but the time element in the plane demanded oxygen. The cockpit could not be hermetically sealed, so masks were adopted — bulky things with huge front protuberances that were always getting in the way of photographic work. A thin line led the oxygen to the mask and had the oxygen any water in it, or any carbon dioxide, freezing, stoppage, and collapse would have occurred. Collapse of the pilot has occurred without fatal results over level ground at high altitudes when the pilot has recovered during the drop, but in the Himalayas any such collapse meant the end.

But certainly the most interesting scientific problems were photographic. Normal air maps are made largely by overlapping vertical shots later superimposed. As compared with distance between camera and ground, minor differences in elevation are unimportant. But when a peak towers ten to 2,000 feet above the surrounding land so that it is 7,000 feet from the camera while the rest of the terrain is 19,000, distortions occur. The timing of space between exposures had to be varied with increasing altitude of the land below. When that altitude became a maximum, as over South Peak or Everest herself, the minimum interval was not sufficient. A distance of a thousand feet at a speed of 120 miles per hour does not permit much photography. Hence the expedition had to supplement the normal vertical maps with many oblique photographs, and here the major difficulties occurred.

All the cameras, of course, had their lenses, shutters, films, and plates heated. One of the neat problems was how to heat film and yet keep red-hot wires safely away from celluloid with an explosive power four times the charge of an 18-pounder. Oblique photographs were

taken by the observer leaning over the side and steadying the camera with springs. None-the-less, there was a considerable personal equation in this operation.

Infrared photography offered one of the most alluring and at the same time most difficult prospects. This method, long known but only recently made practical, had by 1933 reached a stage where long exposure was not needed and where successful pictures might be made with a 1/60th second exposure. But this required a 4.5 lens with a focal length of 25 inches, a heavy object (with its mountings, one that could be barely lifted with one hand). The whole camera was three feet by one foot by one foot. Fortunately, the plane was a converted war plane and the camera was hung where once had been bombs. To operate this camera, the observer lay prone on the floor, stuck his head through, and, hanging down, could insert the plates and release the shutter. He could not sight, so the pilot had a sight in line with the lens of the camera and pilot and observer signaled readiness to each other by twitching a string connecting their wrists. It is interesting to note that the infrared penetrated the mist perfectly but never the clouds or the dust. The camera was so heavy it was not carried in the actual Everest flight.

Many of the other problems of greater technical complexity are discussed in detail — how the oxygen was refined, the mechanism of the cameras, the method of plotting drift, the means by which the voltage of the electrically-wired flying suits was kept between 13 and 15 volts. The electrical equipment of the plane quite exclusive of the motor itself had to activate the camera motors, light indicating lamps, heat oxygen, suits, glasses, photographic gear, and operate a dictaphone which everybody was glad to see get out of order.

The complexities of such an expedition can only be appreciated by reading so complete and modest an account. Free from the romantic thrill of the Nanga Parbat party, the Everest expedition holds a mighty lesson. Its actual scientific results may, as the writers insist, be small, perhaps nothing but a beacon to others, but as a lesson for man and an encouragement to future activity the expedition is tremendously impressive. It teaches how man can, by careful planning and scientific study, so order his conduct in a part of the universe which is actively inimical as to pass through it with relative safety and meanwhile to be concerned not with that safety but with the recording of data which will speed him on his progressive path. This conquest is more important than perhaps our distraught times will permit us to realize. And in its end it carries its romantic fillip. The Dalai Lama, just before his death at the close of 1933, informed the British Government that he could permit no more attempts to climb Everest. The gods of the mountain, it seems, angered at the frequent efforts to invade their domains, had caused the worst summer in 20 years. Henceforth it may be Everest will be accessible only by plane.

Models to Measure Earthquake Effects

INVESTIGATION of engineering problems by means of model structures, a technique which has already had important applications in a number of fields, prom-

ises much in studies of earthquake-proof methods of construction. Research in seismology, which as a science emerged from the metaphysical state only late in the last century, has added much to knowledge of the origin and nature of earthquakes, the movement of the earth's crust, and the speed of the vibrations during seismic disturbances.

In the solution of construction problems the engineer must translate his fundamental knowledge of earthquake movements into terms of their effect upon the structure he is designing in order to test its strength. For simple buildings, he utilizes mathematics, but for structures of more than four stories, the task becomes so involved as to be practically impossible by such means. He has, therefore, long sought other methods of accomplishing his purpose, and, as a result, the technique of laboratory model studies is being rapidly developed.

Studies of great interest now being carried on in Technology's laboratory of engineering seismology in the Department of Civil and Sanitary Engineering, have developed a new type of instrument which directly records the magnitudes of stresses set up in the beams and columns of model structures by artificial earthquakes.

This little instrument (see picture, page 175), which weighs only an ounce or so, by an ingenious system of mirrors, lenses, and prisms writes a record of the stresses on photographic paper by causing a fine point of light to move back and forth across the paper, which, in turn, is kept in motion by the revolving drum seen at the left of the picture. Coincidentally, time marks are "flashed" on the record by an electric spark operated by a magnetically controlled tuning fork. This arrangement enables the observer to compute time intervals on the record to an accuracy of 1/1000 second or better. The instrument is shown mounted on a model of a two-story frame for testing its performance. The models used by this laboratory are made up of flat steel bars welded together at the joints. At the two "floors" of the frame are seen iron weights which are proportioned to represent in miniature the weight of the prototype structure.

A model, built according to the correct "model laws," will react to an artificial earthquake in a manner exactly similar to the way the large structure would react to a natural earthquake, only on a smaller scale. If the scale is chosen properly, it is quite possible to build a model of a ten-story structure having a total height of only four or five feet and a total weight of perhaps a hundred pounds. Such a model can be put on a "shaking table" which produces an artificial earthquake and the results will reveal more than many weeks of careful figuring could. The model automatically solves the problem and in that sense is nothing more than a special type of calculating machine which gives the answer to equations so complex as to be beyond human calculations.

The significance of the instrument designed at Technology is that it will give at once the data that the engineer requires, whereas in previous model study the "deflections," or motions of the models, were measured and from these the stresses had to be calculated by a tedious process. It is believed that an important advance has been made in this branch of the science.

Industrial Problems Under the Recovery Act

Operating, Price, and Financing Questions—The Small Manufacturer

FOR the past two years the Department of Business and Engineering Administration (Course XV) has been holding, for the benefit of its graduates, an annual business conference on New Year's Day. The most recent of these conferences was opened to all Technology Alumni and dealt with the business problems created by the NRA. So pertinent and provocative were the papers presented and so many were the requests received for printed copies that it seemed imperative that they be published. On this and the following pages, therefore, *The Review* presents, in behalf of the Department of Business and Engineering Administration, condensations of the four addresses which were delivered at the Third Annual Conference.

—THE EDITOR.

Manufacturers' Operating Problems Under the Recovery Act

BY WILSON COMPTON

General Manager of the National Lumber Manufacturers'
Association



THREE great industries — steel, textiles, and lumber — have reported general satisfaction with the experience of group self-government under the NRA. And I know that lumber sees no hope except in the present experiment, or something closely resembling it. For us the old way was dead before NRA was born. We believe that unless the latter succeeds, our industry will deteriorate.

The manufacturers of the United States did not at first welcome the National Industrial Recovery Act while it was still a bill. It grew grudgingly out of the idea of spreading work, which was approached by various

bills in the First Session of the 73rd Congress aimed at drastic reduction of the daily and weekly hours, 30 hours a week maximum being a favorite. There was no suspicion of promoting industrial recovery by such a schedule of labor hours. The sole intent was to spread work; important enough.

It was fundamentally a gesture of social justice, the thought being that if there was only so much employment in this distressed country, all workers should have parts of it, instead of giving all to forty millions and none to ten millions. As a plan for increasing employment and payrolls, it was obviously useless. Increase of employment and of wages could finally come only from an increase of the source of remuneration, which is, of course, production. Eventually Congress got away from the idea of merely spreading work and adopted an act aimed not merely at spreading employment but at industrial recovery. When the legislation began to take that form, manufacturers were quick to see its benefits.

When they found that each industry could establish a group code to enforce fair competition — codes which would in effect be federal law — they became enthusiastic; although further reading raised dark doubts; as when they encountered the collective bargaining provision regarding labor, and another relating to maximum hours and minimum rates of pay. They were deeply impressed with the conviction that at last the archaic anti-trust laws were being denatured and that a way had been found to suppress the unsocial competitor who was ruthless of group or public welfare if only he could make a profit for himself, however ephemeral or meretricious. The more meditative and reflective industrialists saw in the act an opportunity to save capitalism from ultimate annihilation by socialism — for they had long pondered what would be the end of a competition that simultaneously wiped out competitors and saturated markets with the destructive competition which would wipe out still more competitors.

We turn for a moment to the effort of industry at large in the framing of codes of fair competition. These have been heroic. Over 1,000 of these codes have been filed with the Administration. Four hundred have passed through public hearing. One hundred eighty-two have

been approved by the President. It is a fair estimate that of all business and industry coming under the purview of the Recovery Administration, nearly 60% is now included in these approved codes. Eighty-five per cent will be.

In considering what lies ahead of us we must not forget, as we perhaps sometimes do, that the act sets up a temporary experiment limited to a short period of time. We must adjust our findings with due regard to this limitation and direct our thought to a permanent policy that will be sound and workable. But I, for one, do not think we will ever retrace the steps we are now taking.

We are confronted, first, with the job of completing the codes of fair competition themselves. As these codes are approved, administrative bodies must be set up, organized, and put to work. There are difficult and complex problems for every industry and every company — problems of trade practices, labor relations, and the inter-relation and competition between industries, accounting, reports, limitations on production and prices.

The steel industry has already petitioned for an extension of its six months' code, stating in its petition that the record shows an increase of over \$9,000,000 in wages, almost one-third, and over 92,000 increase in employment, almost 30%. These increases were for operation at 44% capacity, as against 47% when the code was adopted, thus attaining, in a remarkable degree, the objectives of increased employment and earnings.

In the cotton textile industry employment increased almost 150,000; there was an increase of 55% in wage rates; and the total payroll rose from \$15,000,000 to almost \$27,000,000 from May to September.

The lumber industry shows a payroll increase of several million dollars per month, with a decrease of 24% in average hours, but an increase of 39% in average wages, and this notwithstanding a 30% decline in volume since mid-summer.

For all manufacturing industries the increase in employment is from 59% in November, 1932, to 71% in November, 1933, based upon the 1926-29 average. This is a 20% gain. Increase in payroll totals is from 38% to 58% — a gain of 30%.

These increases have come with a definite reduction in average hours worked. It is certain that national wealth and income cannot be increased by a general and indiscriminate curtailing of production. Income and wealth can come only from productive effort. Reduction in hours of work can be justified only to prevent production beyond the ability of the people either to purchase or to consume. Its object is to prevent the building up of burdensome surpluses which demoralize markets.

Industrial production which had shown a moderate increase during the last half of 1932, resumed the advance after the bank moratorium in March, advancing from index number 60 in March to index number 100 in July, based on 1923-25 average. In August, however, the index declined to 91, in September to 84, and in October to 77. In England during the same period there was a steady advance.

Our steel and pig iron production shows the same trend with the peak in July and August, and a decline since of 28% and 17%, respectively. Stock and bond prices also are off from the mid-summer tops, 13% and 4% respectively. Comparing again the experience in England, we find there a continuous improvement in all these industries.

Wholesale prices in the United States, on the other hand, have advanced 19% since March, after having remained stationary for the previous year at about 10% below today's level. In England, again, the advance has been about 3%.

There are difficult problems yet to be solved. We can take the time to mention but a few. *First* of these is the position of small enterprises — both manufacturing and distributing. Upon such businesses the burden of the higher cost of operation under the President's Reemployment Agreement and the codes is very heavy, because with limited resources such businesses are confronted with costs so increased as to endanger their solvency and work to their disadvantage as compared with their larger competitors with greater proportionate financial strength.

2. Competition between industries is another problem which the Recovery Program has brought to light. There are many cases of such competition; the most difficult is that of the coal, gas, and oil industries, all serving the same consumers.

Difficult social questions are involved because when oil is substituted for coal, there are thrown out of employment mine workers, railway employes, and distribution organizations, all replaced by pumps and pipe lines requiring the work of perhaps less than one-twentieth of the human hands needed for the handling of coal.

3. A third problem of much difficulty is the establishment of wage differentials between different sections of the country, and between large and small communities. These differentials are the source of acute controversies within industries, each section or locality endeavoring to maintain its position or advantage.

4. One of the great problems of the Administration has been to coordinate the many recovery activities. The National Industrial Recovery Act is only one of 16 laws enacted to promote recovery, all of them inter-related. These laws are under 16 different administrative bodies and almost daily their policies and administrative orders conflict. A typical example is the wage scale set up by the Civil Works Administration. This scale, taken from the Public Works Administration Wage Schedule, is considerably higher than the scale set up by the Recovery Administration codes. Thus it happens that men on temporary employment are earning more than workers under codes in the same communities.

5. Perhaps the most serious complication is that arising between the Agricultural and the Recovery Administrations with respect to food industry codes. This situation has been intensified by the inability of the industries to meet the views of the Agricultural Department upon the provisions to go into codes, as a result of which some 500 food and agricultural codes have been held up almost six months. The issue lies in highly restrictive regulations insisted upon by a group in the



Agricultural Administration. The President has attempted to cut this Gordian knot by taking these codes from the Agricultural Department and placing them in the Recovery Administration.

6. The labor clauses of the Recovery Act have added to the difficulties of its administration. It is sound philosophy that management and labor must work together to produce, with best results to both, their product for its market. If their work is well done, both prosper; if not, both suffer. Any influence which divides the employer and his workers destroys the ability of the industry to do its job well.

The unrestrained competition forced upon business by the anti-trust laws brought about in many industries destructive practices which forced down all production costs, wages among them. Industry has struggled for over 40 years to rid itself of these shackles, and thus it welcomed the philosophy of the National Industrial Recovery Act although it recognized the magnitude of the restrictions implied in the legislation.

But since the record shows 1,246 called strikes involving over a million workers, over 12½ million working days lost, and over \$50,000,000 dollars in wages, it is needless to point out the tremendous economic loss arising from such controversies.

The problems or difficulties of manufacturing operations under the codes may be both external and internal. The external problems include the new and unaccustomed social and governmental obligations, arising from charters or privileges and right coupled with duties and obligations. A new social, as well as economic, adjustment to the body politic and economic is required and is under way. The entire range of industry becomes more or less, as the courts say, affected with a public interest, and the phrase "contrary to the public interest" takes on a new and broader meaning. The manufacturer is finding that the public is beginning to look upon his business more as a mechanism of public service than formerly. That means what he calls "meddling," by citizens' organizations, the press, and governmental bodies — from the Federal Government down to common councils. It means to him policing by the Code Authorities, which is not pleasant, even if sweetened by the name of industrial self-government. It means the disclosure to outsiders of hitherto closely guarded business facts and practices. Personally I believe these trends are constructive and on the whole desirable in the interest of industry as well as in the public interest. But these adjustments are not easy. And often they promote outright rebellion. Especially when public leaders, even members of Congress, openly exhort to code nullification. Sometimes entire communities rally to the cause of code nullifiers and code violators.

The incidence, for example, of the Lumber Code on the operation of sawmills has produced one of the most anomalous occurrences in industrial history. At Beaumont, Texas, 500 employes of a lumber mill struck, not to quit but to stay at work. The mill, having exhausted the quota of production to which it was entitled under the Lumber Code was obligated to shut down. But the employes, it is naively alleged, took possession of the mill, after ascertaining that the order files were sufficient for two months running, and proceeded to turn

out lumber regardless of the Code Authority. Seeing the lumber roll out on the sorting tables and down to the holds of ships, the proprietors (probably fearing that their bank accounts would be captured by force) met the payrolls as usual on the following Saturday. According to reports, this horrendous strike persisted for a week and the helpless employers were compelled to sell large quantities of lumber at a profit and meet the corresponding payrolls. As might be expected, this strike evoked great popular favor in Beaumont, and the Chamber of Commerce supported the strikers against idleness.

In the Pacific Northwest rival sawmill towns have been stirred to bitter verbal hostility by the differing effects of allocations of production. And, in the cases of mills with an export business, limited production has been reflected in deflection of patronage from American to Canadian mills, thus touching the tender nerves of patriotism.

Internal problems are many and varied, some of them far more than operating difficulties. Among the latter are the new "sanctions" of labor relations, such as collective bargaining, recognition of unions, maximum work hours (daily and weekly), limitation of production, minimum prices, observance of uniform standards of manufacture, certification of grade and quantity of consignments, and strict rules of fair trade practice.

The most difficult operating problem which manufacturers have to confront under the NRA is that of reduced output from mills of great producing capacity. For example, about 65% of all of the lumber manufactured in the United States comes from 750 mills (out of 20,000) cutting more than ten million board feet per annum. It would not be far from accurate to say that each of these larger mills was intended to operate on two shifts. They are in their owners' intent practically two plants. A two-shift daily output, when lumber is bringing low margins of profit, is necessary in order to absorb the overhead of costly plant and extensive timber reserves — both, but particularly the latter, eating their heads off in taxes.

Yet, in order to meet the objectives of the National Industrial Recovery Act, without which of course there could have been no Lumber Code or any other code, it became necessary to restrict the mills to a maximum of 30 hours a week for the months of October, November, and December. Before the code became effective as regards production quotas, there was a sharp increase of lumber sales; and a great many of the mills had been operating for several weeks with double shifts, each shift at least eight hours, signifying a minimum work week of 96 hours. It is not difficult to visualize the readjustments which had to be made in converting a mill running under high pressure, 96 hours a week, into one dawdling along at 30 hours a week. From a third to half of the men had to be laid off completely or else put on staggered rolls, and in many instances the weekly pay envelope was unavoidably reduced in response to the mandate of the Industrial Recovery Act to spread out work and increase the rate of pay. In some mills and some parts of the country thousands and thousands of men were actually drawing more pay from April 1 to September 1 than they are getting under the Code. Today others are getting some of the work and some of the pay.

Take the NRA mandate of shorter hours and higher pay an hour. For many, and usually the most efficient and successful manufacturers, this often means curtailment of unit production, out of which comes both wages and profits. Overhead goes on much as before, fixed and immutable. Interest charges are not reduced and large capital confronts small output. This situation compels tedious and tireless attention to all the economies of manufacture, a process which is intensely distasteful to many dashing industrialists who have in years past gloried in painting their canvas with broad sweeps of the brush.

Restriction of production in accordance with quotas hobbles business expansion. Orders must be rejected when in excess of the quotas allocated by the Code Authorities. In such cases captains of business feel that the rewards of initiative, energy, and excellence of manufacture are unjustly curtailed. Even if superior efficiency gives them substantial benefits in such industries as enjoy minimum prices, the limitation of production is exasperating.

Let me cite a case from my own industry, remarking first that the Lumber Code, in general, fixed the work week at a maximum of 40 hours, with Code Authority quota allocations subsequently fixing or implying as low as 30 hours. The manager of a hardwood lumber mill writes me that the limitation on production even though accompanied by higher hourly wages has caused reduction of the net pay of his employes, who find that the cost of living has simultaneously increased. This executive offers no apologies for his former 60-hour week, but finds 40 or less practically impossible. Where formerly he could accept orders, if they came, he has to reject all in excess of a single 40-hour shift. "The net result," I quote, "is a shrinkage in our gross volume which operates to revise upward all costs other than direct labor, which has, itself, materially advanced, due to the wage rates paid under the Code." This man explains that his order file is not sufficient for two shifts even if his allocations permitted, but would provide ten or 20 hours per week for a single shift.

Still another lumber manufacturer tells me that "the difficulties of operating a sawmill under the present Lumber Code are so numerous that it would probably

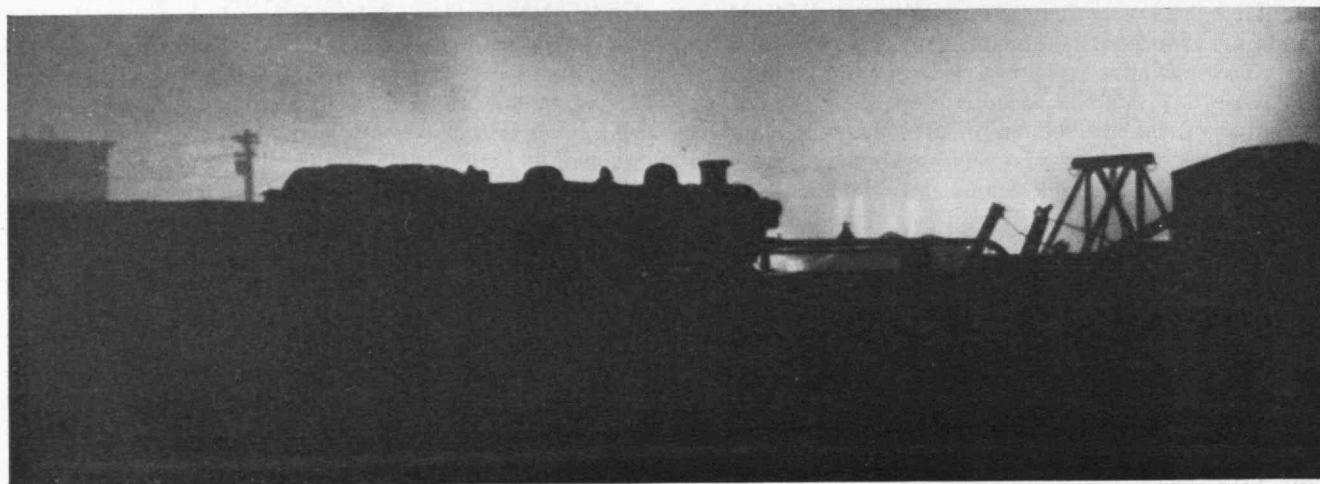
take a good-sized book to contain them all, and then after it was written it would not be complete as new difficulties develop daily." But this man is for the NRA and declares his intention to make a success of it.

Problems is a word that has a negative sound. When one discusses problems the emphasis is inevitably upon obstacles, difficulties, and disappointments. Hence, what I have said that contributes to the shadows of the picture of the nation in reconstruction must not be mistaken for the full picture as it is and will be. The apparent evils that have been raised up in the stress and strain of economic reorientation may yet turn out to be blessings. To the Tories, the American Revolution was infamous. To the British colliers of the 1830's, coal could not be successfully mined without children as beasts of burden. To the slaveholders, the South could not exist without slavery.

There are many signs that a change of opinion is coming rapidly to many instinctive opponents of the NRA. One such, a manufacturer, has recently written to the Executive Officer of the Lumber Code Authority: "While the ramifications of NRA are so many and so wide that we are figuratively standing on our heads, yet we have finally come to the determination that this program, taken in all of its aspects, is perhaps the best thing that ever happened to our industry. At the proper opportunity I shall be only too glad to retract my criticism of a month ago. If individualism means perpetuation of the small manufacturer, I can say that the Lumber Code is the finest thing that ever happened to it, because it puts the manufacturer of moderate and small capacity into the field on an equal basis with his bigger neighbors, who during the last three years have had all the advantage."

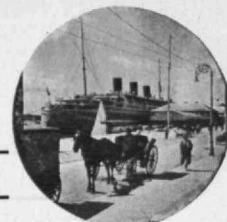
In the final analysis, most of the troubles of operation come back to the imposition of a common group pattern upon the individual. They may, therefore, be said to be the troubles of an adaptation to something which may be described as a new social order. They are the groans of disturbed inertia.

We are too near to this bewildering "new deal" which has come upon us with the suddenness of a violent revolution to be able to interpret it without emotional



Train Yards at Night

John P. Elting, '31



distortions. It may, to be sure, prove a reactionary revolution, subversive, if it persists, of a better order than it substitutes. Government intrusion into every sort of business may finally, it is true, work to destroy the good of the old system without replacing it with the good of a new and better one. We may, of course, become neither socialist nor individualist, and may trade efficient individualism for a weak, hybrid socialism. But a revolt from the old way was inevitable, regardless of whether its end product may be only a return to where we were, as has been the ignominious case with the revolt against intoxicating liquor, in which many of us blithely and hopefully assisted 13 years ago.

Business men, economists, political leaders, technocrats, are trying earnestly to find the answer to this problem of want and suffering in the midst of plenty. Our world is confronted with a new economic picture — an economy of surplus, while through all the ages past until 50 years ago man has faced an economy of scarcity, of want; an economy under which it was necessary to work long hours to secure bare necessities. Today we can produce far more than we can yet consume. It would seem that civilization should not find such a problem permanently beyond its control. Civilization as yet has not, but it must, solve this problem. The answer, some say, is in a planned economy. Yet we must not mislead ourselves as to our ability to plan far ahead. Nearly one-half of our workers are today engaged in industries which did not exist at the start of this century.

We are making this effort under the Recovery Program. That in my judgment is its greatest promise for the future. The advance into new fields of enterprise which has come in the past 30 years is sufficient proof of the need for individual initiative. There will be only halting progress otherwise. Let us not fall into the mire of bureaucratic regimentation with the inevitable decay of that technological advance which is absolutely fundamental.

We still seek to solve the present master problem of manufacture: how to shape production to consumption and to increase consumption. The effort distracts, bedevils, and sometimes overwhelms the individual. So we try it by industries acting collectively. It may be that we have come unawares, without provision or careful forethought, upon a solution.

Perhaps the groping common mind is finding the way out. "There is some one who has more intelligence than Voltaire," wrote Talleyrand, in a former and familiar epoch of flux and change, "more intelligence than Bonaparte; more intelligence than each of the Directors — than each of the Ministers, past, present, and to come. *That some one is everybody.*"

And Talleyrand added something that may be a guide to each of us in ascertaining and performing our duties at this time: "When we simply follow the necessity of an epoch, we are certain not to go astray. To engage in, or at least to persist in, a struggle against what, according to general belief, is a public interest, is a political fault — and at this day all political faults are dangerous." We are at least finding a common denominator of public and private interest. That in itself is great progress.

The Manufacturers' Price Problems Under the Recovery Act

BY ROBERT F. ELDER

Assistant Professor of Marketing



FROM the marketing standpoint, the problem which seems to be uppermost in manufacturers' minds is the effect of the NRA codes upon prices. In the first place, there is the question as to how far the individual business man must resign control over the prices he charges to his industry acting collectively through its Code Authority, or to some government agency. Secondly, there is the question as to

what benefits he may expect to obtain from collective policing of his industry's price situation.

Having made concessions to labor which substantially increased his costs of operation, the average manufacturer is looking for an opportunity to recoup these increased costs, plus, in many cases, a satisfactory margin of profit which has been lacking, by acting in concert with his competitors to advance prices. Unquestionably these added costs must be met in some way. There is no question that in many cases starvation wages have resulted from a type of ignorant or vicious price-cutting, and that the maintenance of decent wages depends upon the elimination of this type of competition. One way to handle this situation, and a way which comes easily to the mind of the average manufacturer, is for the members of an industry to agree on definite fixed prices. How far is this a proper solution?

The setting of fixed minimum prices and their enforcement will obviously end this price-cutting. However, it will not necessarily insure profits or result in a satisfactory degree of employment in an industry. In the law of supply and demand we have a statute which Congress cannot repeal nor the Supreme Court declare unconstitutional. Arbitrarily set minimum prices eliminate flexibility in the price structure. The necessary adjustments must then take place in other ways. If prices are fixed too high, consumers will refuse to purchase. If they are set too low, producers will curtail the flow of goods to market, and people cannot buy all they want. Apparently no one has suggested that there is any danger of minimum prices being set too low by agreement among producers.

Proposals for fixed minimum prices presume that price-cutting is economically detrimental. It is not. It is the process by which economic readjustments are made. Naturally, a producer whose costs are higher than the prices quoted by a competitor wants to restrain that competitor from underselling him. Yet we have a long history of attempts to fix prices. In practically every case the attempt to maintain a rigid minimum price has actually injured the very people it was sup-

posed to benefit. The Stevenson Act, designed to insure profits to British rubber producers, handed over their markets to the producers in the Dutch East Indies and to the reclaimers of old rubber. More recently and nearer home, the fixing of resale prices in the milk industry has so curtailed the household market of dairy farmers as to reduce sharply their total net return. Price fixing has been tried under the Dry Cleaners' Code, and the attempt has again proved that if you try to squeeze an elastic market, it contracts. There should have been enough instances by now to convince everyone that arbitrary fixing of rigid minimum prices does not permit adaptation to the dynamic conditions of modern economic society. Economic laws will continue to work. We can prevent them from operating in one direction, but this merely causes them to expend their force in another and perhaps more troublesome way.

It is necessary to make two exceptions to the statement that price-fixing is detrimental. In the case of natural resources, such as coal, petroleum, or lumber, where the supply is definitely limited, or where we are consuming faster than nature is replacing, it may be advisable to set a minimum price and to decree that if the product is not worth this price, then it is better to conserve it for the future. The other exception is in the case of industries which by their nature must be monopolies. Price-fixing is inherent in monopolies. With a system of state control of monopolies in every line of business, it might be possible to make price-fixing work. It may be true that that is the only way to make it work.

It is well to draw a sharp distinction, however, between the fixing of rigid prices and a reasonable degree of control over an industry's prices. Under a system of absolutely unrestrained competition, there are many frictional forces which impede the action of economic laws, and prevent a proper equilibrium from being established. In recent years, particularly in the latter stages of the depression, competition has to a considerable extent been blind. In the wild scramble for such business as existed, openly quoted prices were pretty much disregarded. Special discounts and concessions became the rule rather than the exception. No manufacturer could know with certainty what his competitors' actual price to a particular customer might be. The industrial purchasing agent and the buyer for the large mercantile establishment could in effect dictate their own prices. As a result, the actual price which manufacturers received for their goods was often lower than the price which would have resulted from free and untrammelled operation of the law of supply and demand. Fear of a competitor's price-cutting or the representations of a dishonest buyer became potent price-making forces. Men who tried to run their businesses on an honest, intelligent, and efficient basis were forced to face the competition of those vendors who were cutting prices at the expense of their workers or of their trade creditors. Added to this was the ignorant competition of those who did not know their costs. Perhaps there is no reason why a business should be prevented from committing economic suicide. There certainly is every reason to try to prevent a combination of murder and suicide.

What should be the nature and extent of price control which is within the public interest? Certainly no sympathy is due the manufacturer whose competitor is cutting prices and still meeting his proper obligations. However, it is not in the public interest to force a manufacturer who is operating efficiently to meet competition on a sub-economic price level which is based, not on greater efficiency, but on exploitation of labor or by defrauding of creditors, or by dissipation of the assets of investors. The primary reason for the NRA code trade practice provisions is to afford protection against this sort of illegitimate competition.

We must be careful, however, that in protecting the scrupulous business man from his predatory competitor, we go no further in controlling prices than to achieve the approximate result of unhindered operations of the law of supply and demand. If we go further and introduce elements of rigidity into the price structure, we are shackling legitimate competition and introducing sources of further maladjustment. The way out of depression is not through a small volume of production sold at high prices; it is not through a conspiracy between industry and labor to secure large profits and high wages by exploiting the consumer. We must not fall into the error of regarding industrial profits as something sacred to be safeguarded at all costs. They must be earned by constantly increasing service to society as a whole. The true reason for permitting regulation of competition under the Fair Practice provisions of the codes is to prevent a manufacturer who has honestly earned a profit from being unjustly deprived of it by unfair actions of its competitors. We must not shut our eyes to the very real danger confronting the whole recovery program from those who see in the codes an opportunity to do those things which called the Sherman and the Clayton Acts into being.

One of the commonest mechanisms for price control found in the code is the open price agreement. This differs from the old open price associations, always perfectly legal under the old anti-trust laws, which provided merely for the publishing of prices on sales already consummated. As many of the approved codes read, each manufacturer in an industry submits to the code authority the schedule of prices at which he proposes to sell. He may not sell at a lower price while this schedule remains in force. However, he may at any time submit a new schedule, which becomes effective after a specified interval. In the interim, competitors have an opportunity to revise their schedules. The effect of this plan, of course, is to produce uniformity of prices. This aspect of it has been subject to severe criticism. As a practical matter of fact, however, every business man must keep his prices uniform with those charged by his competitors for equivalent goods. This plan merely brings competitive prices out into the open. The only privileges of which it deprives the individual manufacturer are the opportunity of making secret concessions and the possibility of taking competitors by surprise by a price reduction.

The open price plan ought to work well in industries where grades of products are fairly well standardized. Where definite standards do not exist, there would seem to be plentiful opportunity for evasion by altering qual-



ity. A few codes provide for the setting up of product standards in order to make the open price plan effective. In general, this plan is probably the most easily enforceable of the various methods of price control used in the code. The difficulty of enforcement will probably be proportional to the number of concerns in the industry. Some opponents fear that the open price agreement may be used as a vehicle for monopolistic price fixing. This danger undoubtedly exists. Whether the open price provision will appreciably increase the employment of such tactics is a debatable question.

Some of the open price arrangements go further. They provide that the code authority may investigate any schedule of prices filed by any producer in the industry. If the prices filed are held to be unfair, the producer may be required to file a new and satisfactorily higher scale of prices. This is a dangerous provision. It vests in the Code Authorities the power to interfere with normal price adjustments resulting from the operation of economic forces. It grants the power to discriminate in favor of one group of producers at the expense of others. It does not necessarily follow that such power will be selfishly used, but the past history of American business does not encourage too great a degree of reliance on the altruism of the average business man. The most serious objection to the granting of such power is the fact that its abuse must inevitably lead to a greater degree of government regulation of industry than most of us would regard as desirable.

Another very popular code provision is that which prohibits selling below cost. This is probably more sound in theory than in practice. Its virtue is that it is invariably coupled with a uniform system of cost accounting, use of which is made mandatory for all members of the industry. It should thus prevent price cutting based on ignorance of cost, which we all know has been an important factor in demoralizing business. It should work out fairly satisfactorily in industries where costs are definitely allocable to specific products. Where joint costs predominate, as is the case particularly in the distributive trades, the method is of doubtful value. Enforcement of this provision will present complicated problems. To prove a violation requires an investigation into the suspected offender's costs. Even under a uniform system, accountants may well disagree as to how certain charges should be handled in a specific case.

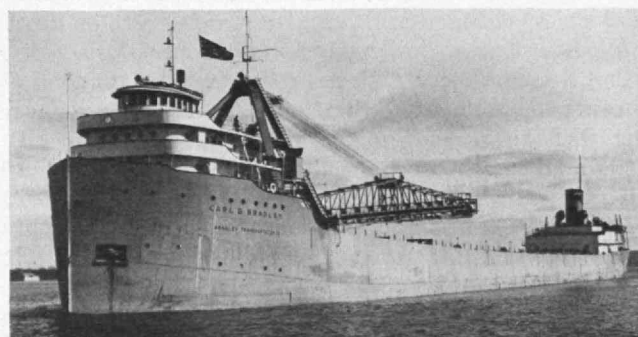
Most of the codes which use this provision permit any producer to meet a price which is legitimately set by a competitor. This has the effect of defining the minimum lawful price as the cost of the lowest cost producer. This minimum is probably lower than the proper economic price for the commodity. In a few cases, as in the gasoline pump manufacturers' code, producers are forbidden to sell below their own individual costs. This clearly puts it up to the high cost producers to reduce their costs or to get out of business. Such a scheme should speed up the processes of economic law. Its social consequences, particularly with regard to various local employment problems, would furnish an opportunity for endless debate.

In some cases where no standard plan for allocating costs to different products can be equitably applied, codes have attempted to set up rules which permit

selling at a price which covers only direct costs. The retail code, with its provision against selling below invoice costs, is essentially of this nature. It does not abolish unwarranted price-cutting, but it does have the advantage of doing away with the worst aspect of "loss leader" selling. In other cases, average costs are used. As a practical matter, this provision would be practically inoperative in cases where the customary spread between cost and selling prices is wide. Where cost variations are wide and margins close, it would seem to deprive the low cost producer of a legitimate competitive advantage.

One form of price control which we seldom recognize in its true guise is the placing of restrictions on production. The commonest way of doing this is to limit machine hours, as the textile industry has done. To make limitation of machine hours effective involves also placing restrictions upon new equipment. There is no denying that the most effective way to raise the price of anything is to curtail the supply which comes to market. There are certain inherent disadvantages in limitation of machine hours. If the limit is set low enough to affect prices, it tends to benefit the high cost producer by forcing the low cost mill to turn away business. This tends to reduce the incentive to lower costs. The limitation of new equipment may conceivably result in the stagnation of an industry by closing the door to new blood, new ideas, and new processes. Such limitations are fundamentally inconsistent with the ideal of a higher standard of material welfare for the entire population. In spite of the unsoundness of limiting production as a permanent policy, however, we may concede its desirability as a temporary expedient in certain cases. When we face a dangerous emergency, we ought to use the quickest method to clear up the situation, whether that method is sound or unsound as a permanent procedure. In doing this we are merely following the example of the physician who prescribes a poison or a habit-forming drug for emergency treatment. The physician, of course, has sufficient sense to stop the unsound treatment after the emergency has passed. The business man is likely to reason that what was good for him when he was sick will also be good for him after he has been cured.

The Trade Practice provisions of codes are going to present many difficulties in enforcement. Certain exceptions must obviously be made. There are the questions of obsolete goods, of seconds, or damaged merchandise, of excess inventories which must be disposed of, but which cannot be sold at the code prices. It is difficult to



A Freighter on the Great Lakes

provide for these exceptions without leaving loopholes large enough to invalidate the major price provisions. In certain industries one of the most disruptive trade practices has been to undercut list prices by billing certain customers for seconds while supplying them with first quality merchandise. To stop such a practice will be difficult. With staple manufactured lines it may be possible to limit sales of seconds to a fixed percentage of total production, as at least one code has done. In style lines, however, who can decide whether a markdown below the minimum prices defined in the code is legitimate competition or not? What provision is to be made for the orderly liquidation of bankrupt stock? These are weighty problems which remain to be solved.

The factors which have affected prices so far have been the increased labor costs under the wage and hour provisions of the codes, and increased material costs due to processing taxes or to advances caused by buying to anticipate inflation. The price control provisions of the code have begun to operate in only a very few instances, and even here we have little or no statistical evidence as to their results. We do know that the advances in retail prices which have occurred so far have operated to decrease the physical volume of goods sold. This effect will vary from one commodity to another according to whether markets are elastic or inelastic. Price control through limitation of output in the textile industry seems to be working out advantageously. The fixing of minimum prices in the dry-cleaning industry and in the dairy industry we know has had a decidedly adverse effect on the volume of consumption. When we look at such indices of retail prices and trade volume as are available, we see that as prices have advanced, dollar sales have also advanced, but at a somewhat slower pace. In other words, the physical volume of merchandise sold has shrunk. This is a somewhat disturbing situation, particularly as retailers in general have not been advancing prices as fast as wholesale costs have risen. They have as a rule followed the practice of averaging cost of goods previously purchased at low prices with cost of current purchases, taking the normal mark-up on the resultant figure. This situation indicates still further advances in retail prices. What will be the effect of these on physical volume, and hence on employment, depends largely on how fast purchasing power can be increased. Consumer resistance to higher prices is merely a matter of arithmetic. Most incomes have not advanced. If business volume, and hence employment in private industry, is to improve on a sound basis, prices must be held down within reach of consumer pocket-books.

We hear a great deal today about the need for stimulating those industries which produce capital goods. By limiting the hours of machine operation in many industries we have laid the foundations for expansion of operations in this field. But we must not overlook the fact that the only sound basis for building new plants or expanding old ones is a need for an increasing volume of goods. Government purchases may "prime the pump," but when we compare the few billions the government can spend with the 40 or 50 billions of business done in even a poor year, we see the futility of depending upon government expenditures to do the whole job.

This brings us finally to the question as to what price policy should be followed by individual manufacturers or by trade groups in meeting the current situation. It is obvious that prices must be advanced to cover increased costs of materials and labor. Part of these increased costs may be covered by the elimination of unwarranted price concessions, improper credit terms, and other unsound trade practices. This should be done as far as possible. Efforts to cut expenses should not be discontinued. In some industries it may still be necessary in order to maintain volume to set prices on a basis which permits little more than the recovery of out-of-pocket expenditures. The all important thing to strive for is the retention of existing customers, the expansion of their consumption, and the addition of as many new customers as possible. In the years just preceding 1929 all too many business men were willing to sacrifice profit to get volume. Today, as markets are just beginning to widen, many concerns are seeking their profits in longer margins rather than in greater volume; yet this is a time when the need for volume predominates over most other considerations. The important factor to keep in mind is that business, employment, and profits will not pick up until people are buying more and more goods. They cannot buy them with wishes. Therefore a policy of extreme moderation in advancing prices would seem to be the soundest course to follow during the present emergency.

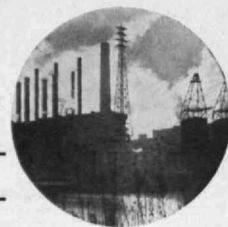
Business Finance Under the New Deal

BY FLOYD E. ARMSTRONG
Professor of Political Economy



PROBABLY no other part of the business administrator's problems is as definitely affected by the circumstances and implications of the New Deal as the financial. This is due no less to uncertainty as to what may be done than to what has already transpired. The NRA, the New Securities Act, the banking reform measures, and other developments directly or indirectly influencing financial management are circumstances already faced, while the doubt and uncertainty that exist concerning the future of our currency is casting its shadow over the business world, restraining it in many instances from proceeding with aggressive steps which otherwise it might undertake.

It must not be understood from the foregoing paragraph that it is to be the purpose of this discussion to criticize or condemn the efforts being made at Washington. The administration is confronted with a stupendous task and, rightly or wrongly, is carrying forward a two-fold campaign with two distinct and not always con-



sistent lines of attack. It is undertaking first to bring about that industrial recovery on which we depend for relief from our economic distress and the correction of those maladjustments which are responsible for the present burden of unemployment. Secondly, it is making a gallant effort to so change the economic and social mechanism under which life carries on, that equity and justice may be realized to a greater degree than ever before and a recurrence of our present dismal condition be made less likely through the substitution of some sort of a planned economy for the older *laissez faire* system of unrestrained individualism. As to the desirability of these objectives, few will disagree, but there are many who fear that too great an emphasis on the reform movement will retard if not impede industrial recovery. To create a social economic order that will offer security for the masses while retaining something of opportunity for individual accomplishment, with the rewards for such effort, is no easy task. Yet that is what is being undertaken, and business realists will be wise if they recognize the facts and act according to the situation as it is and not as it might be desired or as it would have been without the New Deal.

The driving force that has, in earlier depressions, finally started us on the uphill path of recovery has been the profit opportunity that existed because prices, wages, interest, and other production costs had reached their low. A spark of industrial activity somewhere in the inter-connected economic system would set into motion a line of cumulative forces, under these low price conditions, that would spread and grow until finally the entire industrial machine was once more in motion. *Low prices constituted the stimulus that brought about the desired result.* The New Deal has reversed this procedure and is undertaking to raise prices as one of the first steps in the recovery movement. The economic reasoning behind this line of action is of course to create consumer buying power as a stimulant to business. It is not to the point of this paper to examine the economic soundness of that doctrine, although it may properly be noted that it contravenes the orthodox line of reasoning. It is to the point, however, to observe the effect of its application on the financial manager and his problems.

Assuming that we are in the process of recovery (and there are many evidences that we are, for business is no doubt substantially better than it was ten months ago), we may inquire as to the financial needs of such recovery.

Broadly speaking, there are two kinds of business operations that call for funds. First, there are the ordinary needs of daily operation — the payroll and other expenses of production and shipping of product. Second, there are the needs of expansion and, even more important at this time, the replacement of plant and equipment. These latter expenditures are expensive and ordinarily call for the assistance of outside financial agencies — banks and investment houses. It is at this point that business is feeling the pinch of the administration program. The capital market has been practically closed. Almost no funds are flowing into enterprise for capital expenditures. Incidentally, it is at this point also that we find the most serious jam in the way of reemployment. Colonel Leonard Ayres has estimated that something over five-sixths of the unemployed are

unemployed because they are in normal times directly or indirectly engaged in making durable goods. The durable goods industries are not yet in operation, on anything like a normal scale. Large groups of service workers await the spending of these durable goods workers before they in turn may get to work.

There are a number of reasons why business is not performing its usual rôle of expanding and replacing worn-out and obsolete equipment at this time. First of all, there is the discouraging influence of advancing costs under the operation of the NRA. Profitless recovery may be possible, but not through the free and vigorous initiative of private enterprise. It takes the spur of profit-making opportunities to stimulate aggressive business activity. Second, the stream of new capital is rather definitely stopped at its source by the unwillingness of lenders to make commitments under the existing uncertainties that surround our monetary system. Six or eight months of currency manipulation with the threat of positive inflation lurking in the background does not constitute an influence encouraging to the loaning of money on long-time commitments. Indeed, one of the few definitely concrete promises which the President has made is that he will not desist from his purpose to make the dollar worth less than it is now — that he will raise prices by one means or another — but do it he will. And so it is small wonder that people of wealth hesitate to buy bonds of long-time maturity, when they have the absolute promise of the government that the money that will be returned to them will be worth less than the money loaned. It is therefore easily understood why the usual annual flow of from three to five billions of dollars into industry through the sale of corporation bonds has shrunk to almost nothing — perhaps three or four hundred million in 1933.

To the foregoing should be added the influence of the New Securities Act, the fears of bankers still struggling under a load of unpaid and undigested mortgages, and the doubts and fears that persist in the minds of bankers as to the operation of the deposit guarantee law. The Securities Act of 1933 has probably been over-emphasized as a deterrent to new financing and refinancing, yet it can hardly be doubted that it is a substantial obstacle in the way of such activities. It is perhaps true that it does no more than codify and make concrete the lines of liability that already existed under the common law. Nevertheless, a positive deterrent to financing has resulted from the act of revealing that which had been a somewhat remote risk as being a very direct and serious threat. Moreover, this threat and the uncertainty that surrounds the question of its enforcement has operated not only to prevent those questionable, not to say fraudulent, flotations against which the law is wisely directed, but has also had the effect of stopping the ordinary flow of private funds into clearly legitimate lines of enterprise. Sharp distinction should be drawn between flagrantly wild speculative commitments and ordinary business risks. The United States has progressed rapidly in the past, largely because there has always been available an adequate supply of what might be called "risk" capital. None is available now, for business financing of all sorts is practically at a standstill.

The current needs of business for operating expenses do not as a rule present so difficult a problem for the executive, but at this point it becomes necessary to differentiate between the sound and prosperous enterprise (there are such even after four years of deflation) and the company that still manages to keep going, but under increasing difficulties. For the former there is no problem so far as working capital needs are concerned, unless it be the problem of what to do with their own redundant cash assets. And indeed this is a problem for many concerns. It is a fact to be recorded to the credit of American business men that so many corporations entered the present depression thoroughly fortified with cash. If they have survived the banking crash without losing their deposits, they have been considering the use of their funds. For them the threat of rising prices was the sign-post telling them the way to go. Expanded inventories have consumed their cash and to them, too, the banks and note brokers have given respectful attention as they have asked for loans. Low discount rates to such favored borrowers, plus low prices for their raw materials, has placed them in the most fortunate position imaginable as business has turned upward. Some of the more courageous of such concerns will not be in the market for raw materials for the next 18 months or two years.

If, in special cases, it is inadvisable or impossible to take advantage of low prices to expand inventories, the manager of a rich treasury will be well advised to play safe rather than to attempt to use the funds profitably. Indeed, it may be said that safety rather than profit-making is for most companies still the slogan, although the time has come when managements should be alert to the first signs of government action that will spread confidence in the stability of our monetary system and the safety of commitments.

What now of the many companies that are not fortunate in having a redundancy of working capital, but are reduced to an absolute minimum and are still trying to carry on? Theirs is indeed a difficult task. First of all, they are subject to the severe competition of the more fortunate concerns in their field, whose position I have just described. Second, if they are among the smaller corporations, they are being pressed by the terms of the NRA codes, most of which have been written under the controlling influence of the larger and stronger units in the trade, and which in many cases make it practically impossible for the erstwhile marginal concern to survive if the terms of the code are to be met. Third, and often overlooked, a period of rising costs and rising prices puts a strain on the working capital of a company just because of those rising costs. It is apparent that payroll requirements for a hundred workers at \$10 a week will be 50% greater if the wage is advanced to \$15. And so it becomes just that much harder to stretch the limited and inadequate working capital to the pattern of the new demands. It should not be overlooked that inadequate working capital is generally the occasion (though not ordinarily the cause) for financial embarrassment. Thus we are likely to witness the ironical tragedy of many concerns surviving the depths of the depression only to fall in the early months of recovery through the operation of influences that flow from the very efforts of the government to restore prosperity.

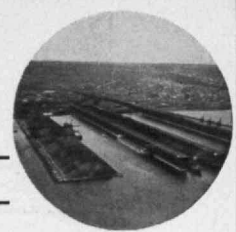
Concretely, what may be done by such companies to assist them over their difficulties to what may be a new lease of life, or if not, to provide for them a respectable though perhaps a delayed burial? A firm of business doctors for companies in and around Greater Boston has been busy during the last few months and has discovered the following methods, which among others may help them to meet their problem:

- (1) Reduce the scale of operations, cut out unprofitable lines, and concentrate on profit-making activities if there are such.
- (2) Reorganize, cut down capitalization, and reduce book values of stock and inventories to an actual basis of fact. Then start from scratch. It will be possible very often to show a profit on such reduced values. The psychological effects are encouraging, and if there are no pressing creditors or if they are not too numerous and their claims are not too great, the way may be opened for recovery.
- (3) A general overhauling of the expense items may reveal enough possible small savings to rescue the company from the threatened ruin.
- (4) Leveling of labor costs; *i.e.*, cutting down higher salaries and wages, as an offset against the higher costs imposed under the recovery acts.

This method is, of course, not to be approved as a general practice and cannot be commended in principle. It is no doubt a violation of the spirit of the New Deal and is therefore open to criticism. But desperate conditions sometimes call for desperate measures. It may be better to violate the spirit of the law, while necessarily conforming to the letter, than to roll up completely and land in the bankruptcy courts, thus adding to the numbers of the unemployed.

- (5) Finally and frankly, rely on the code agreements to lift prices sufficiently to offset losses and added costs. Then hope that the government will continue to deal gently with such cases, and neglect to prosecute under the anti-trust laws. Time being the essence of the problem, even deferred government action may prove the salvation of many.

The most reliable basis for business hope and confidence is, after all, the certainty that economic forces have not ceased to operate. Indeed they have been operating even against many government-made obstacles. Tariff barriers, trade quotas, arbitrary price fixing, currency manipulation, increasing tax burdens, rapidly rising costs, and so on are all obstacles in the way of a normal recovery under the urge of the profit motive. Yet progress is being made, because the time has come when the forces making for such progress are too powerful to be overcome by continuing fears or by social reform efforts which, while highly commendable from the standpoint of human welfare, are nevertheless deterrents to private initiative. This is not a time for unbounded optimism. Still less is it a time for cringing fear or unreasoning pessimism. Rather it is a time for thoughtful, hard headed realism. To him who, with this attitude, views our tangled business life, it is apparent



that the way is being opened for an era of sound and substantial recovery, that we are indeed well on the road toward that recovery. Given a continuance of even a modified capitalism, we shall see business surmount the financial difficulties it now faces and rise to new heights in a social-economic system where rugged and honest individualism still has its chance, and where a high measure of mass security shall have been attained. Increased confidence is the one element yet to be added to the situation, to the end that the flow of private capital may once more vitalize the arteries of trade. The government has in some measure substituted for banks and investment houses in meeting the long term financial needs of industry and it is likely to do more of this during the coming year. It was necessary that it should do this in the pursuit of its ends as previously stated and under the conditions that have obtained. Real recovery will be realized, however, when our currency question has been settled, when a sound monetary base has been established, when timid private capital again returns to the market, and when financial management once more reaches out in aggressive business undertakings, tempted by the lure of even reasonably attractive profit possibilities.

Problems of the Small Manufacturer Under the NRA

By ERWIN H. SCHELL

In Charge of the Department of Business and Engineering Administration



BY WAY of introduction, may I say that the problems which I am considering are those which arise directly from the regulations of the NRA, and which have been laid before us by Technology graduates.

The fact that we are thus concerned with difficulties brought about by the NRA should not be construed to mean that I am therefore antagonistic or critical of its activities. I am charged solely with the responsibility of offering constructive suggestions for meeting these difficulties. Whether their existence is justified or necessary is a question quite apart from my consideration.

These suggestions will be directed to the small manufacturer, whom I define roughly as employing, in normal times, a hundred hands or less. Furthermore, I am talking primarily to the small manufacturer who has been in business for some period of time — who has succeeded thus far in outwitting the depression — but who must play his hand in the New Deal with an old deck of cards.

I should also say that my recommendations are based on the assumed continuation of the improvement in business which has been experienced since the summer of 1932 by most, if not all, of the important industrial

countries of the world. I am assuming, however, that the small industries to whom I am speaking are outside of that happy category, referred to by Professor Armstrong, whose concern is the proper investment of surplus. My audience is to be one with whom day-to-day operation must provide the wherewithal for day-to-day existence.

Finally, I should make it clear that my recommendations are applicable to short- rather than long-term policy. I am starting with conditions today and talking about the next three to six months.

Perhaps the most serious problem reported by the small manufacturer is that of increased labor costs under NRA regulation. Material costs have likewise increased, though this difficulty has been somewhat damped by judicious purchases for inventory at previous lower prices. In many of the smaller industries, restriction of working hours has also affected overhead costs unfavorably. In short, all of the factors of operating costs have been definitely advanced.

The rising price level, as it is increasing the cost of manufactured materials and supplies, is also increasing working capital requirements. This is a difficulty to which the small industry is unusually sensitive. Frequently large industries supplying these raw materials have introduced code regulations which have materially reduced credit extension to customers. On the other hand many small industries find that similar restrictions are not acceptable to their markets.

In meeting competition, small industries located in a rural community frequently have been able to offset the disadvantages in transportation and allied expenses by lower labor costs. The NRA, while equalizing labor costs in many industries, has introduced no countervailing equalities in transportation costs. As a result, the small town plant finds itself burdened with a new competitive handicap.

Again, there is a feeling that such codes as have been developed have come mainly from conferences composed of members of the larger units in a given industry. Designed from the experience of these bigger operating units, the codes have not reflected the needs of the small companies, and in many instances have incorporated features which bring advantages to the big plant at the expense of the smaller.

Finally, small producers are subject to new forms of sales competition under NRA regulations, in which the price factor must play a less important part. Furthermore, many patents have run out during the long depression, leaving the little fellow without the marketing protection which originally may have been his reason for entering business.

These are the primary problems of the small manufacturer and are the problems with which I shall deal.

First, may I consider the general question of increased operating cost. It is absurd to assume that these increases can be passed on to the customer. It is clear that either additional values must be introduced into the product in order that the higher price may be justified, or that these greater costs must be neutralized through improved or increased plant operation to the point that the final unit cost yields a price within the range of present purchasing power.

Those of you who have carried your businesses through this protracted period of depression have learned that vital principle of distribution; namely, that to keep alive a concern must keep its customers. In other words it must maintain its business relationships. When purchasing power fluctuates, those businesses which would survive must relate their cost and final prices to the ability of their market to buy.

In attacking the problem of increased labor costs, small manufacturers have as a resource the most loyal, the most versatile, and indeed the most valuable operating personnel of all of our industrial plants. Therefore, the small manufacturer has the best opportunity of anyone in his industry to win the cooperation of his employees in the reduction of unit labor cost.

Practically all of you in my audience know where these economies may be introduced. During the past months you have studied your particular problems and have discovered ways and means of reducing unit costs. There is nothing in the present situation to release you from the imperative necessity of making these cost reductions. I congratulate you upon having the type of labor which is best qualified to cooperate with you in the acceptance of the new methods and procedures which will allow these economies to occur.

In this connection, may I reiterate my statement at this Conference last year in regard to the surprising savings, where hand work on general purpose machines is in large proportion, which result from the newer simplified methods of applied motion study. Field tests by our students who have specialized in this technique rarely show less than a 40% saving in operating time.

Your policy can be no different in the field of material cost. If you have not already done so, you should start at once to survey the field of possibilities for substitute materials or allied substances which will give you equivalent results with reduced initial costs. More than this, the amount of excess material discarded at each step in your process should be carefully determined in order that possibilities of reducing the loss may be reviewed. Often, entirely new methods of manufacture have paid for themselves within a short period through their economies in materials. Especially should you beware of interpreting as operating gains any advantages which may now come to you as the result of using materials purchased at previous lower prices. Proper accounting procedure should separate these gains from the results of operation.

Conversely, it is unwise to hold at purchase price inventories of raw materials or supplies procured before or during the early part of the price decline. These romantic values only serve to distort your costs and form an obstacle to a constructive sales policy.

Increased overhead costs as they relate to buildings and equipment must be viewed in still another light. If NRA regulations require you to reduce your hours of plant operation, by so doing they may reduce your profits. They should not increase your unit overhead costs charged to product, for excess overhead charges normally absorbed by full-time operation should affect profit and loss as unabsorbed burden. The cost of what you do not make should not be considered a cost of what you do make. Every item of overhead expense should

be reviewed for possible economies resulting from reductions in working hours. Hardly an item of your expense but will be affected by this lessened demand.

But you know well enough that the most effective method for the reduction of overhead *unit* cost is through the building up of output. With the general return of confidence in future business conditions, it is of the utmost importance that all of your past customers be given opportunity once more to resume relationships with you; and a price policy which makes this possible will also go far toward striking at the heart of your difficulty in this overhead cost area.

A prevalent financial difficulty of the small industry is lack of working capital. The reasons for this condition do not require detailing. My problem is one of meeting rather than explaining the difficulty. Because the situation is very common and because it will increase in severity with rising prices, there is some basis for the prophecy that the Administration will increase the nature of assistance already offered to industries through the Reconstruction Finance Corporation. More than this, there appears to be a growing tendency on the part of banks to extend credit against the assignment of orders. By this method, day-to-day financing may be made possible for the small industry.

A serious loss in working capital may result from code changes in trade credit practices. Many codes are incorporating clauses restricting the use of extended credit. Frequently the small industry must accept these new regulations from its suppliers but is unable to secure similar terms from its customers. It is an axiom of commerce that size brings trading strength. But it has also become an axiom of American government that there shall be equality of opportunity irrespective of size or influence. The small producer may anticipate that, as codes become stabilized, inter-credit regulations will be such as to free him from undue hardship.

In the meantime, the important principle to follow is that, with the drift toward increasing business activity, increase in trade momentum is of first importance. If additional working capital is imperative, its procurement, through the drastic liquidation of existing assets, is to be favored over any restriction of the productive program.

A most concerning problem is that of the small manufacturer's unstrategic position in the organization and subsequent modification of codes. The large operator, with his staff assistants and subordinate executives, can free himself from the daily demands of his enterprise and devote his time more readily to these negotiations and conferences, which frequently occur over considerable periods of time and at a distance from his plant. Hence, codes may tend to be modeled to the specifications of Big Business and perhaps to the disadvantage of the small operator.

If this condition has existed, it must obviously be mended. If present codes place inequitable burdens upon the small manufacturer, they will be corrected if they are to hold water. The Administration in Washington well knows the futility of any regulation which does not broadly appeal to the conscience of those regulated. But we should remember that logical progress in code construction must deal first with larger aspects, later



giving consideration to their significant but dependent factors.

Nevertheless, problems are rarely solved best by waiting. The principle upon which action should be based is that in organization, in administration, and in operation, the small manufacturer is basically different from the larger operator in his industry. The variation is not one of degree but of sheer genus or species. Therefore, in every industry, small manufacturers should assemble — not for purposes of conflict with the larger units — but in order that they may, through proper representatives, effectively voice their requirements and necessities. The larger manufacturer and the government should welcome, in the code councils, these spokesmen of the smaller interests.

A related problem is that of the small manufacturer located in the rural area. It is clear that the contour of his costs, though they total the same, may properly be different in point of weighting to labor, transportation, and certain fixed charges from those of his city or suburban competitor. Such variations should be reflected in code restrictions, but the logic of progress demands that other broader questions of code organization precede them. The future is certain to bring constructive changes through the recognition of these inherent geographic differences.

Action in this instance should take two forms. First, the individual company should ask the granting of exceptions to general code regulations. Such an appeal should be based upon comparative statistics which reflect the company's position with respect to cost. Second, the company should show due diligence in the attempt to reduce those charges (such as transportation) with which the locality of its plant has unduly burdened it. Every concern whose yearly transportation bill exceeds \$5,000, or exceeds 5% of its annual sales, should have a traffic audit made, for the purpose of disclosing possibilities of economies. There are numerous reputable agencies, who specialize in this technical service and whose counsel may be sought. Again, those companies adversely affected should lay these specific problems before the general freight agents of their servicing railroads in order that surcease may be indicated during the period of code readjustment.

This leads us to a vital problem of the small manufacturer as he operates under the code; namely, the new nature of his sales competition. Codes are unquestionably stabilizing and narrowing prices. More and more, they will weaken price as a factor in competition. The rapidly growing acceptance of the open price agreement, the general attack upon secret discounts, and all forms of allowances and rebates is making for a more homogeneous price structure. Appeal to patronage must find new bases.

Among the many justifications of the small industry, perhaps the most important is the opportunity which it affords to the proprietor and perhaps a few associates to attract custom through an unusual capacity, either for specialized quality or for creative personal service. All kinds of people go to make up a world, and the niche for him who possesses these unusual aptitudes, coupled with natural independence of spirit, is in the small establishment. Here is found the stronghold of the

little fellow. To a considerable degree, his technique is professional in that he fits his value most sensitively to the peculiar needs of his customer and frequently creates or designs his worth to his client, *after* rather than *before* the signing of the contract. These are powerful competitive weapons.

Let us consider specialized quality. This usually opens zones of trade so definitely circumscribed in extent as to have no attractiveness for the large operator. Yet customers are characteristically willing to pay a fair price for a product whose special quality has unique merit for them.

Even more secure is the trade relationship where mutual confidence and understanding permit the small manufacturer to work out with his customers, whether they be manufacturers, wholesalers, or retailers, the peculiar characteristics of the new product to capitalize new consumer trends which the customer can the more clearly see.

But to sell either of these services, one must sell personal ability. One rarely buys of a small producer because of his facilities. One buys because there is a particular kind of genius there with whom he personally can deal and from whose personal standards of service he may benefit.

If you accept this prelude, your attack upon the problem of sales competition becomes clear. Whatever controlling genius there may be in your business, that is the personality that should be placed in contact with your customers — past, present, and hoped for. This job cannot be delegated. If you are the genius, it is your job — not that of a sales manager or other subordinate — and if you no longer have the energy or courage to undertake the gruelling work of contacting your old customers of '27, '28 and '29, then you may be sure that every day will be a poorer day for you.

A final word about patents. As a small manufacturer, avail yourself of their protection whenever possible, but don't build your future upon them. There are better competitive weapons for you. The greatest of these is personalized good-will. Customers always prefer to deal with the principals rather than representatives. They are willing to pay for this privilege — not by higher prices, but even better, by repeat orders. The cheapest order to obtain is the repeat order between the customer and the proprietor; for here the letter or the telephone can more readily take the place of the call. The small company with the majority of its sales resulting from repeat orders can realize merchandising economies that the large operator can never achieve. With prices stabilized, there is no protection so potent as personalized good-will. No one is in better position to build good-will than is the head of the small business.

In closing, may I say that, as a small manufacturer, your imperative responsibility to your company is to assure its partaking in the gradual rise in business which is internationally indicated. First, you must regain your physical volume of trade with your old customers. This can only result from unit costs which permit prices within range of their purchasing power. Then, as the skies continue to brighten, you may find fair profit and competitive protection in specialized quality and creative personalized service.

THE INSTITUTE GAZETTE

PREPARED IN COLLABORATION WITH THE TECHNOLOGY NEWS SERVICE

Everett Morss and the Institute

THE Secretary of the Class of 1885 in his class notes in *The Review*, January, 1906, says: "'85 is to be congratulated on the election of Everett Morss to the Presidency of the Alumni Association. No man has put in more telling work on the Walker Memorial or Technology funds, and besides raising money, he has given his influence and efforts in season and out of season to the Institute."

Could the Secretary or the members of the class have looked forward into the future, they would have included the Institute among those to be congratulated, for this really records the entry into Institute affairs of one who for the next 27 years was to demonstrate his courage, loyalty, and capacity for constructive and persistent effort in its behalf. There began an interest that never wavered nor waned.

The Institute was in a most precarious condition at that time. There are thousands of alumni living, graduated since that day, who have never realized how close the Institute was to passing out of existence as a distinct educational entity. Both faculty and alumni had been torn with dissension on the proposed merger with Harvard and while there was a definite majority of both groups in favor of carrying on if possible, a number of the most influential were of the opinion that it was in the best interests of both institutions to consummate such a merger.

The legal decision that settled the question did not of itself pour oil on troubled alumni waters. A strong man was needed to weld together the scattered fragments of alumni loyalty, opinion, and action. In Everett Morss, a strong man was available and it was characteristic of him to accept the responsibility involved in the task that lay ahead.

And it is particularly noteworthy that he was re-elected President of the Alumni Association in 1907, the

only instance of a man being asked to serve for more than one year since 1901. He was too useful to be retired to inactivity.

During his second term, not only was the foundation laid for the Alumni Council and substantially the same Alumni organization as exists today, but the Alumni office was definitely established in the Rogers Building. And more important, the Corporation was persuaded to admit to its councils, men nominated by the Alumni Association, adding three new term members each year for five years' service. This plan is still in force and the result has been that from these term members many notable additions to life membership in the Corporation have been made.

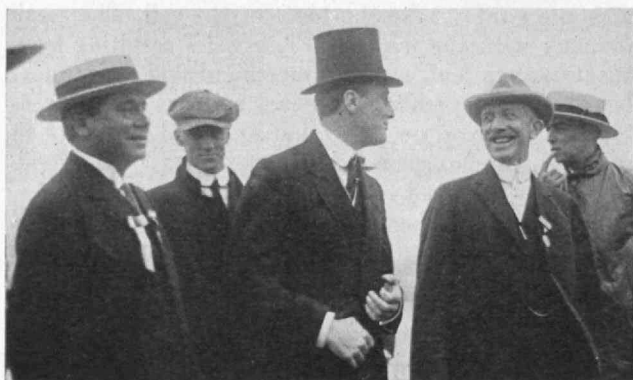
Everett Morss was among the first group of three Term Members nominated and confirmed by the Corporation in 1908. His term ran until 1913. But it is particularly significant that within two years, while still a Term Member, he was elected to the Executive Committee of the Corporation and served continuously on that Committee to the day of his passing. This means that he had a responsible part in the transition from the Technology of the early days to the new Technology as we know it today. In the selection of the new site, in raising necessary funds for its purchase, in the new construction and the development of the new facilities desired, he was always to be counted on.

In 1921 he succeeded Francis R. Hart, '89, as Treasurer of the Institute, Mr. Hart becoming Chairman of the Finance Committee. He brought to this office a background of experience and personal information regarding the Institute's affairs seldom possessed by an incoming executive of an educational institution.

At this period the Institute was without a President and was being operated by an Administrative Committee. Mr. Morss, as Treasurer and acting Chairman of the Executive Committee, sat regularly with this Administrative Committee at its weekly meetings.

And the consuming interest that he had in all matters relating to the Institute never ceased. It covered all phases of dormitory development, of infirmary operation, of the installation of the mural paintings and the other decoration of Walker Memorial, and particularly the campus development. The landscaping and tree planting in the Great Court, the additions of grass and hedge, roads and walks were subjects that he was always willing to consider and encourage.

He thoroughly enjoyed construction details and initiated many of these projects that have made for marked improvement in the operation of the physical plant. The conversion of the power plant from coal to oil this past summer — a rather major operation and done on his recommendation — was followed by him in most intimate detail. It was the last of many such betterments for which he was responsible.



Franklin D. Roosevelt when Assistant Secretary of the Navy and Everett Morss, '85, at the Dedication of Technology's present buildings in 1916

His knowledge and long participation in the financial affairs of the Institute, as well as of many other corporations, made his task as financial officer of the Institute a pleasant one. And the successful financial operation of the Institute during his entire connection with it will be a record for future administrations to match.

For all these years of constant and financially unrecompensed service and of real responsibility, he asked nothing from the Institute except the satisfaction of seeing it develop rationally, go forward confidently and always, as far as possible, carry on its work to the best advantage.

He had great pleasure in his avocations. Practically all of these avocations involved institutions or projects calling for work or responsibility, or both. That, however, was his "play" as he often expressed it. It is our judgment that he was never happier than when giving time, thought, energy, and action in behalf of his greatest avocation — the Institute.

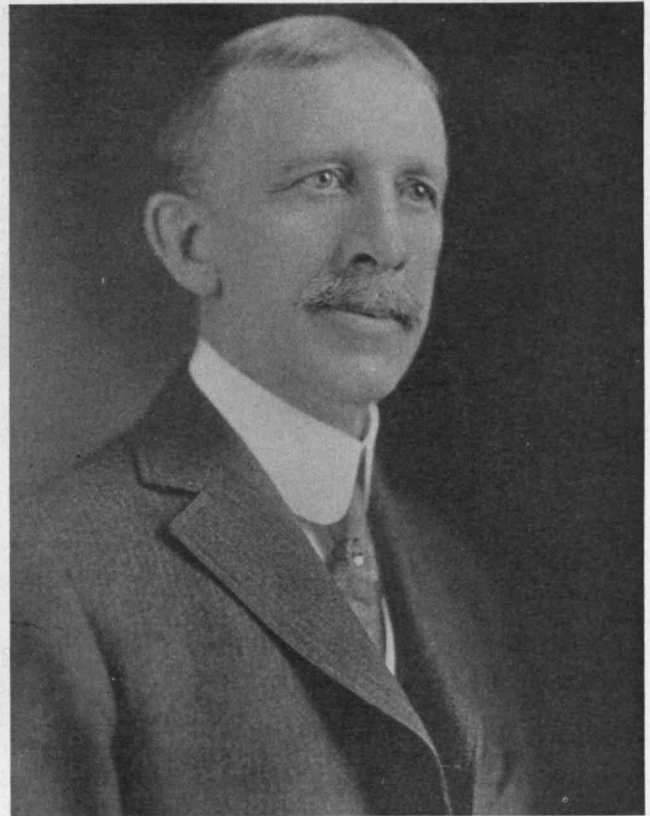
Highways and the Motorist — a Survey of Accidents

A COMPREHENSIVE scientific survey of highway accidents in Massachusetts has been undertaken by the Institute at the request of Governor Joseph B. Ely, in connection with the program of the Civil Works Administration. Professor Robert C. Eddy, of the Department of Business and Engineering Administration, was appointed recently by President Compton to take charge of the investigation as Director of field and statistical operations.

This notable study of vehicular accidents and their causes is made possible by a fund of \$190,000 authorized by Joseph W. Bartlett, Chairman of the CWA of Massachusetts. The work is being carried out in conjunction with the State Departments of Public Safety and Public Works, the Governor's Committee on Street and Highway Safety, and the Registry of Motor Vehicles, and has already given employment to more than 900 men, the majority of them engineers who have been unemployed for some time.

The survey is to include a study of law observance, an aspect of highway regulation on which little accurate data is now available. Preliminary studies already point to the chronic violator of traffic regulations as the cause of the most serious accidents. In this phase of the investigation, observance of traffic rules on speed, signs, passing, and turning are being checked by engineers at hundreds of locations throughout the state. One object will be to determine the correlation between volume of traffic and accident frequency.

From an analysis of accident records of the past four years involving personal injury, a group of engineers under the direction of the Department of Public Works are preparing "spot maps" of accident locations. These are then sent to engineers in the field, where they are augmented from local studies and police records. The data is finally submitted to the local authorities as definite recommendations which they have helped to formulate, with regard to stop signs, traffic lights, road construction, and other safety factors.



Everett Morss, '85 (1865-1933)

The ready coöperation of towns and cities with survey officials has resulted in the creation in several localities of a definite plan of remedial traffic procedure to extend over a period of ten years. Such plans include a complete traffic census and the forming of a traffic flow map, the study of traffic violations, and the disposition of these cases during the last three years.

A study of illumination and highway visibility, correlated with safe speeds for various climatic conditions, is expected to reveal unusually interesting facts regarding weather and safe driving.

"R.A."

STUDENT opinion, social activities, and sports in the Institute's School of Architecture have been focalized through the organization of a representative student group known as the Rogers Association.

The issue of a movement begun last fall for a more adequate medium of student thought and recreation, the R.A. now boasts a constitution and an executive board of directors representing every class in the school. Thus far the association has successfully sponsored a dance and two smokers, as well as tournaments in basketball, handball, and ping-pong.

Bôcher Prize to Dr. Wiener

THE award of the distinguished Bôcher prize for outstanding work in mathematical analysis was made jointly to Professor Norbert Wiener, of the Institute's Department of Mathematics, and Professor Marston Morse, of Harvard University, at a meeting



Richard Bell, '34, Technology's champion indoor sprinter and President of the Senior Class, presiding over a meeting of the Institute Committee. Control of student affairs is vested in this committee, which is composed entirely of students. It discharges its great responsibility judicially and effectively

of the American Mathematical Society in Cambridge on December 28. The presentation formed a notable feature of the mathematical sessions of the American Association for the Advancement of Science.

Robert Henry Smith

THE death of Professor Emeritus Robert H. Smith, 71, at his home in Watertown, Mass., on December 11, terminated an affiliation of 47 years with the Institute's Department of Mechanical Engineering.

Genial and constantly helpful in his professional work, Professor Smith was known to generations of Technology students, who in their machine tool courses found him an enthusiastic and thorough teacher. Always alert to advances in his field, Professor Smith took particular pride in providing the most up-to-date facilities in the machine tool laboratory.

Born on February 21, 1862, in the Province of Quebec, Professor Smith was graduated from Granby Academy in 1879, after which he took special courses at Technology and Harvard. In 1923 he was awarded the honorary M.S. degree by Rhode Island State College.

He joined the Institute staff in 1886 as an assistant in the school of mechanic arts, and a year later was made instructor in machine tool work. Subsequent promotions led to his appointment in 1931 as Professor of Machine Construction. He retired from the Institute staff in July, 1932, with the title of Professor Emeritus. Professor Smith had been an honorary member of the Technology Alumni Association since 1928.

He is survived by his widow and two sons, Waldron, a junior at Tufts College, and Prescott A., a junior at Technology.

Professor Smith was one of the pioneers in the application of scientific methods to the teaching of practical arts, and was the author of several texts relating to this field, including "Elements of Machine Work," "Principles of Machine Work," and "Advanced Machine Work."

He was a member of the board of directors of the Mercantile Library Association, the Faculty Club of Technology, and the Unitarian Club of Watertown. He was a member of the Revere Lodge A.F. and A.M., a charter member of the Richard C. Maclaurin Lodge A.F. and A.M., a trustee of Massachusetts Lodge, I.O.O.F., and a director of the Odd Fellows Hall Association. He was also a past Noble Grand of the Odd Fellows.

Building Against the Winds

A NEW method of analyzing the stress in building frames due to wind forces was discussed by Dr. John B. Wilbur, '26, of the Civil Engineering Department in a recent address before the Designers' Section of the Boston Society of Civil Engineers.

Because tall buildings must be designed to resist great wind forces, the problem of providing safety and freedom from sway in these structures is one of great importance to engineers.

In the modern skeleton frame type of construction, wind loads are carried by the framework of a building, which consists of the columns and floor girders. The analysis of the resulting stresses is complicated because the stress due to wind in each member of the framework depends upon the make-up of every column and girder in the entire framework.

Because of this condition, an exact analytical solution would involve the solution of an extremely large number of simultaneous equations. To avoid this, engineers usually resort to approximate methods which neglect the effect of the make-ups of the columns and girders upon the resulting stresses.

The method developed by Dr. Wilbur takes into consideration the make-up of the members of a building frame in such a way as to avoid the use of simultaneous equations, and gives results which are more accurate than those of the methods in general use. While based upon the involved principles of the method of slope deflection, it is simplified by providing a definite working formula to be used in routine computations.

Commuters' Ease

LONG-NEEDED facilities for the comfort of day students at the Institute are provided in a new lunch and study room opened by the Commuters' Club on January 8 in the basement of Walker Memorial. Open house was held during the remainder of the term for inspection by visitors and for the convenience of commuters desirous of applying for membership. The room is now available only to members of the Club, and upon special application, to local clubs and organizations.

The commuters' new headquarters is divided by draperies into two sections, one containing tables and a drinking fountain for the use of students at lunch time. The front section is furnished as a lounge and reading room, in which new easy chairs and study tables, together with a small collection of well-chosen books from Walker Library, contribute to an atmosphere of quiet comfort.

Technology in Review

FOUR of Technology's Deans appeared at the 169th meeting of the Alumni Council on November 27 to report to alumni on the state of the Institute. So informative were their statements that The Review presents below the complete summaries of their addresses prepared by Secretary Charles E. Locke, '96, for the official Council minutes.

1. VANNEVAR BUSH '16

Vice-President and Dean of Engineering

Dean Bush had been given three questions: (1) Where do our good students come from? (2) To what extent is it now possible for an outstanding student to receive financial assistance? (3) How completely do our students acquire the professional attitude and handle their own affairs? To answer the first question, slides of the geographical classification of students for the year 1932-33 showed that 943 students come from local sections in New England, 1,235 from the balance of the North Atlantic states, 130 from the South Atlantic, 52 from the South Central, 250 from the North Central, 78 from the Western states, eight from the Territories and Dependencies, and 135 from foreign countries. In addition, 357 of our students are graduates of other colleges, representing 142 American colleges and 42 foreign colleges and universities. In analyzing academic



Redfield Proctor, '02, President of the Alumni Association and recently appointed to the Executive Committee of the Corporation to serve during the absence of Elihu Thomson, now recovering from an illness

rating of various classifications of students of the Class of 1935 during their first four terms at the Institute, it appeared from the foregoing geographical classification that there was consistent improvement in all of the groups, there being a consistently high rating of the students from the North Central states, beginning with an average considerably above any of the other groups and consistently maintaining this lead. Foreign students who enter with a rather low average rating of 2.44, rise to 3.09 during the first four terms. From another analysis of this same class during the first four terms, based on preparation, the classifications being those students entering from high school, from preparatory school, from a combination of high and preparatory, college transfers who have had less than one year at another college, and those who have had more than one year at another institution, it appeared that the high school students are consistently above any of the other groups, the college transfers with less than one year at another institution rated second, the students from preparatory schools rated third, those from both high and preparatory schools rated fourth, and college transfers with more than one year at another institution rated lowest.

On the second question of the extent to which the Institute renders financial assistance to well-qualified students of high abilities and promise, figures indicate that the total amount of loans from the Technology Loan Fund for the year 1933-34 amounted to \$195,974. This was distributed among 486 individuals, making the average amount of the loans \$406. The men's scholarship awards for the year 1933-34 amounted to

\$18,050 for freshmen, with an average award of \$273 and a total of undergraduate awards of \$41,091, with an average of \$147. The women's scholarship funds for the same period amounted to \$3,850 with grants to 11 individuals, making an average award of \$350. Figures on the cumulative totals of the amount of loans from the Technology Loan Fund, with various supplementary data indicating repayments, postponements, and so on, showed that although there have been postponements in a number of cases, the repayments to the Fund are coming in consistently. In addition to the scholarship and Technology Loan Funds, there are special funds such as the Bursar's, Dean's, Grimmons, and Rogers Funds, which are drawn upon under unusual circumstances where a student of promise needs assistance in addition to that granted for his tuition. In very special cases a student has been granted a loan of as much as \$300 in addition to his tuition.

To answer the third question of the extent to which our students exhibit the professional attitude in handling their own affairs, Dr. Bush presented an organization chart showing the relationships and control of the many undergraduate activities in Technology, including the various publications, the Athletic Association, the dramatic and musical organizations, the Technology Christian Association, and the numerous other smaller groups. The manner in which our students acquire the professional attitude in handling their own affairs is attested by the fact that we have undoubtedly the largest dormitory group in the country which operates entirely through student self-government. There is not a single proctor in any of our dormitories. Our Athletic Association is unique in the degree to which the students handle their own affairs, arrange schedules, handle the financial transactions, and other matters pertaining to the operation of the athletic program, with the guidance and counsel of the Advisory Council on Athletics.

2. WILLIAM EMERSON
Dean of Architecture

Dean Emerson was given two questions: (1) What sort of cultural experience is involved in an M. I. T. education? (2) Is the Institute becoming a more pleasant and a more healthy place in which to work? He dealt with the development of cultural subjects at Technology, spoke specifically of general studies, and mentioned other ways in which a student acquires knowledge of subjects outside of his strictly professional work, which resulted in a graduate broadly trained and able to talk intelligently on many subjects.

With the development of the many activities and student organizations of the present day, the dormitory life, and other features, there is far greater opportunity for social contacts among students today than existed in earlier years. All these contacts help the student to rub elbows more satisfactorily with his fellow men, and incidentally to rub off some of his rough spots and give him a better polish. All of these social relations, together with the facilities and benefits of the infirmary, can give but one answer to the question of whether the Institute is a healthier and happier place. Dean Emerson felt that assuredly the answer was "yes," but he added further that we had not reached the end by any means, and there still existed increased possibilities for further

humanizing of the student body. Perhaps he inferred, although he did not say so specifically, that the staff might benefit as well.

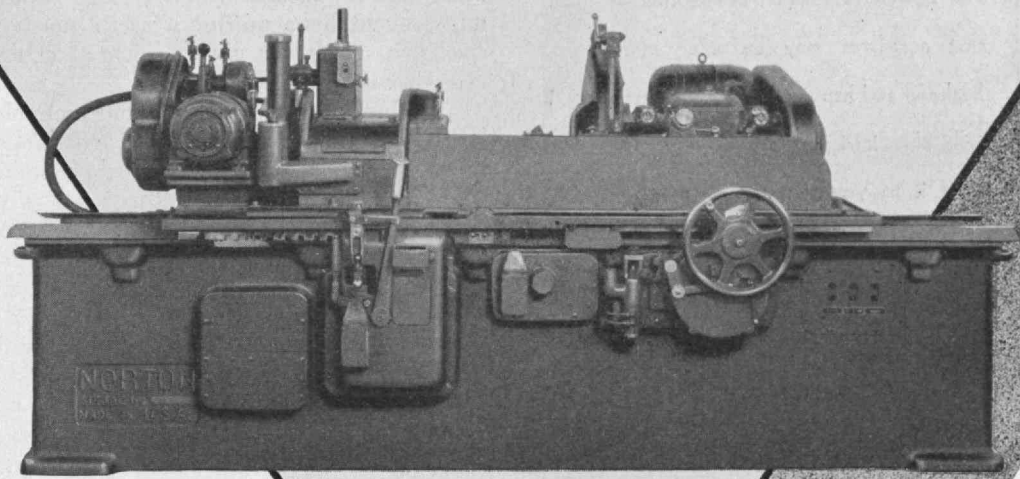
3. HARRY M. GOODWIN, '90
Dean of the Graduate School

The three questions for Dean Goodwin were: (1) To what extent do we qualify for the title of an international institution? (2) Is a proper balance of emphasis being maintained between undergraduate and graduate work? (3) Are the standards of our graduate school as high as those of any graduate school of science, engineering, or architecture in the country? He has very kindly summarized his talk as follows: One of the most important problems in engineering education at the present time is the development of graduate work. This is being studied by a special committee, of which President Karl T. Compton is Chairman, of the Society for the Promotion of Engineering Education and at the recent meeting of the Association of Land Grant Colleges in Chicago, the "Graduate School" was one of the leading subjects for discussion by the engineering section.

The growth of graduate work at the Institute during the past decade has been so rapid as to lead to the establishment in 1932 of the Graduate School which includes the graduate work in the Schools of Architecture, Science, and Engineering. Thus the number of doctors' degrees conferred increased from eight in 1923 to 30 in 1932, and masters' degrees from 32 in 1920 to 256 in 1932, respectively. Of the 680 degrees recommended by the Faculty during the present year, 238, or over one-third, have been awarded in the Graduate School — 38 to candidates for the doctorate and 200 to candidates for the masters' degree. The registration in the Graduate School during the depression has fallen off relatively less than in the undergraduate school. Of the 500 at present pursuing graduate work, 18 are in the School of Architecture, 166 in the School of Science, and 316 in the School of Engineering. Of these, 110 are taking courses leading to the doctor's degree in the School of Science and 63 in the School of Engineering, respectively; 285 are pursuing courses leading to the master's degree. Seventy-three members of the Staff are pursuing graduate work leading to higher degrees.

The national and international character of the school is indicated from the fact that 241 students are graduates from other colleges than the Institute. Among them are representatives of 125 universities located in 36 states and 13 foreign countries. Fourteen National Research Fellows are also working in the fields of chemistry and physics.

Reasons which have contributed to the rapid growth of graduate work are: (1) Revision of undergraduate curricula, taking cognizance of the fact that it has become impossible in a four-year's program to include the more advanced phases of science and engineering. Present curricula stress thorough training in fundamental principles and include an increased proportion of general studies which now extend through all four years. (2) The appeal which a fifth year of advanced elective studies offers to a graduate who usually knows definitely at the time of graduation the field in which his special interests lie. (3) The (Continued on page 203).



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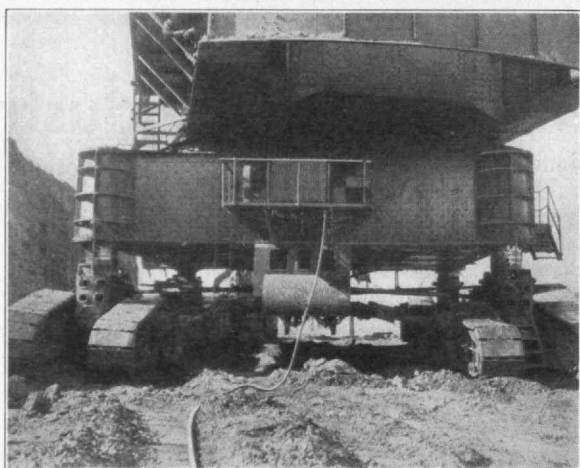


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SECURITY vs. PROGRESS

(Continued from page 169)

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approaches such problems he suffers from his established logics and from the handicap of his habit of dealing with predictable behaviors of tractable and measurable inanimate materials. Moreover, age limitations generally prevent his acquiring a useful mastery of another specialty. Shall the social scientist attempt to make himself a chemist?

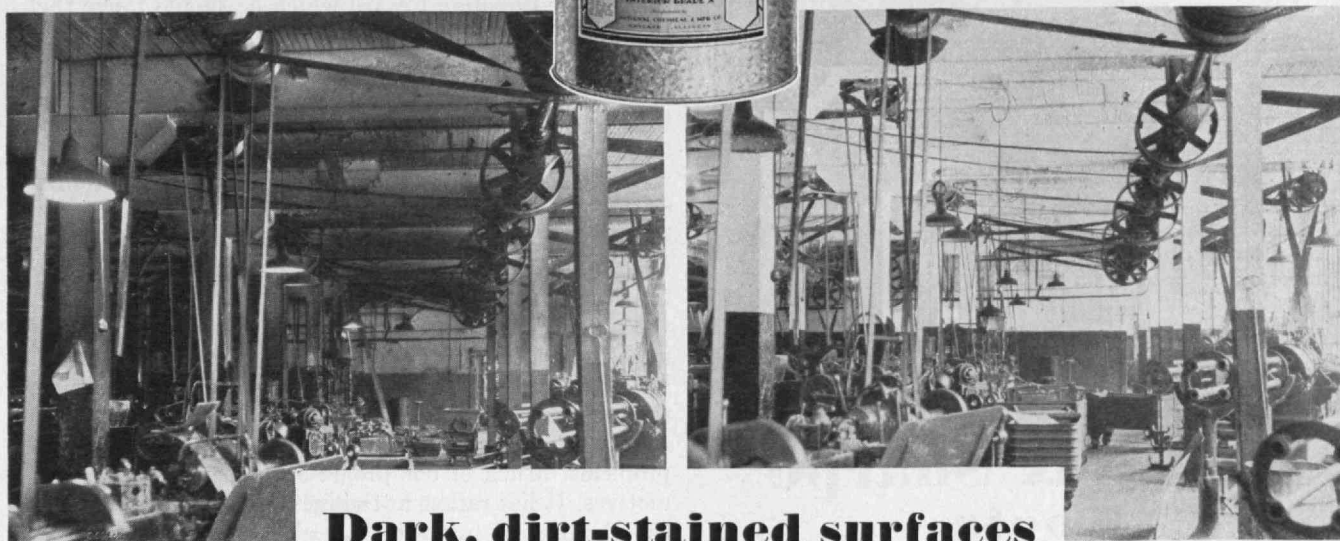
Training in applied science and technology does not in itself equip men to administer with understanding of human relationships and social responsibilities complex social institutions like factories. It gives excellent equipment for establishing the logics of processing raw materials into finished products. It offers little aid in solving intricate questions of human relationships so often responsible both for social failures and for the breakdown of logically conceived production processes. Moreover, this depression has produced no evidence that technical training in applied science equips men for the larger integrations required to meet and prevent such social crises or for handling with understanding the political problems which must always control.

Over 175 years ago Lord Chesterfield defined the relationship of science to practical problems in human relations with a clarity rarely attained. He was presenting to the House of Lords a scientific problem of great workaday importance, the reform of the calendar. In coöperation with the best lawyers and the most skillful astronomers, a bill was cooked up.

"But then my difficulty began: I was to bring in this bill, which was necessarily composed of law jargon and astronomical calculations, to both which I am an utter stranger. However, it was absolutely necessary to make the House of Lords think that I knew something of the matter; and also to make them believe that they knew something of it themselves, which they do not. For my own part, I could just as soon have talked Celtic or Slavonian to them, as astronomy, and they would have understood me full as well: so I resolved to do better than speak to the purpose, and to please instead of informing them. . . . I was particularly attentive to the choice of my words, to the harmony and roundness of my periods, to my elocution, to my action. This succeeded, and ever will succeed; they thought I informed, because I pleased them; and many of them said, that I had made the whole very clear to them; when, God knows, I had not even attempted it. Lord Macclesfield, who had the greatest share in forming the bill, and who is one of the greatest mathematicians and astronomers in Europe, spoke afterwards with infinite knowledge, and all the clearness that so intricate a matter would admit of: but as his words, his periods, and his utterance, were not near so good as mine, the preference was most unanimously, though most unjustly, given to me. This will ever be the case; every numerous assembly is *mob*, let the individuals who compose it be what they will. Mere reason and good sense is never to be talked to a mob; their passions, their sentiments, their senses, and their seeming interests, are alone to be applied to. Understanding they have collectively none, but they have ears, and eyes, which *(Continued on page 198)*

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SECURITY vs. PROGRESS

(Continued from page 196)

must be flattered and seduced; and this can only be done by eloquence, tuneful periods, graceful action, and all the various parts of oratory."¹

Does science equip men for that important part of the task of administrators and politicians which involves appeals to sentiments? Obviously not, but just as obviously Chesterfield needed scientific aid in determining the direction toward which he should move the House of Lords.

Today we have little or no social direction of effort by scientists. Worse still, industry gives much direction to science through great industrial laboratories. This direction is not toward the conscious attainment of wide social objectives but toward the making of profits. Such commercialization of science disturbs many scientists. As a consequence, but wholly illogically, they neither consider nor tolerate any direction except their own scientific interests.

My objection to great industrial laboratories lies not in their inefficiency. They are often peculiarly efficient. It lies not in limitations on the freedom of thought of their staffs. Industry often leaves great freedom. It doesn't even lie in the emphasis on practical commercial problems. Much of our progress is the result of profit motives. It lies rather in the inevitable emphasis given the thought of many of our ablest scientists wholly without regard to the great need for social stability.

Whitehead says the great ages have been unstable ages, but he admits that instability may attain proportions inconsistent with civilization. We now approach that degree of instability. I can agree with him that it is the business of the future to be dangerous, for progress always involves ventures into uncertainty. I can agree that science equips the future for its task of being dangerous. So far I find no evidence that natural science equips the future for that part of its duty which involves preserving enough social stability to make continued civilization possible. If the future be not so equipped, we may well face a dark age with no monks to carry on the torch of knowledge.

IT IS incumbent on anyone suggesting the assumption of important responsibilities by others, not that he lay out a complete program of action but that he offer samples of the categories he has in mind and that he suggest promising lines of approach to the questions involved.

I offer a few sample research projects which might assist in solving great social problems and a brief outline of mechanisms which I believe might stimulate scientific interest in such points of view.

I cite first an example which applies to industrial laboratories as well as to our universities. Our statistical information is quite unsatisfactory, but there is reason to believe technological unemployment resulting from improved machinery and processes has been one important factor leading to this depression. Roughly speaking, such improvements not only throw men out of work temporarily through (Continued on page 200)

¹ Letters of Lord Chesterfield. Letter 247, Volume III.



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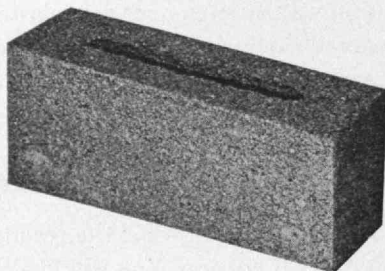
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SECURITY vs. PROGRESS

(Continued from page 198)

their immediate effects, but unless they cheapen products in elastic markets so that on the average they build up demand, they throw men out permanently. On the other hand, new products which appeal to new consumer wants, or supply such wants so much better and cheaper that they become new wants, expand demand and increase industrial employment. Examples of these types will occur to all. I suggest the different effects of the thyatron tube, the electric self-starter, and the commercial process of refining aluminum.

While no one can be sure, I believe we face increasingly effective emphasis on process improvements unlikely to be followed by enough expansion of demand to maintain the old volume of labor in industry.

Mankind must solve the vast problems of unemployment in ways which preserve self-respect by offering employment to the able-bodied and opportunities for self-respecting use of more and more leisure. Not much time is left if a great catastrophe is to be avoided. When this problem is solved, social differences between products and processes will tend to disappear. In the meantime a speeding up of new products and a lessening of scientific attention to new processes might give the time needed to find an effective solution of the whole problem of unemployment. The profit motive has not brought sufficient emphasis on the economic and social differences between products and processes. If the attention of chemists both in industry and in our universities is directed consciously toward this difference, chemistry offers great possibilities of reversing this trend and emphasizing new products.

Let me suggest another example, this time one which involves critical social problems growing out of the shifting balance between industry and agriculture.

There can be no question of the serious nature of our agricultural problem. Chemistry has affected it radically. Consider rayon. This product is hardly 25 years old in any real sense, yet it has already stopped the growth in markets for natural fibers. At first unsatisfactory in quality, it is improving rapidly. Within a decade it may be equal or superior to one or both the natural fibers and radically cheaper than silk. Suppose it supplants cotton even in the fine goods field. Some six million people in the South make their livelihood from cotton. The slowing up of demand is already serious. It may become a social catastrophe.

Suppose on the other hand rayon displaces raw natural silk. Japan's silk growing population must find alternative occupations with great internal and external political and social consequences. Japan may lose its power to import our cotton by losing its chance to export silk. The domestic impact of such a change would fall harshly on our southern cotton growers. Alternative crops are vitally needed. We do not require more food. We need crops which produce raw materials for industry. Chemistry, biology, and industry should search the world over for plants capable of growth in this southern belt and possessing chemico-physical properties needed or useful to industry. Now the problem is left almost wholly to a few agricultural stations and to a small but



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able and imaginative group of scientists working in the United States Department of Agriculture. I have the word of a leader in this group that much more help from the universities is greatly needed.

A similar situation exists in the corn belt. We have lost our export market for hogs. Pests like the corn borer threaten the whole future of corn in this country. Because of the lost export market we need more effective uses for corn and its constituents in and out of industry and alternative crops which can be grown in temperate zones as industrial raw materials. Because of the risks to the corn crop, we need ways of controlling the borer. Much work is now directed at this objective, but the controls may not be found. For this reason here, also, we need alternative crops.

Agriculture must be established soundly. In the decade 1920-1930 industry absorbed many farmers. Now it cannot. Already hundreds of thousands have returned to farms and great groups of our youth are backed up there. If farming can be so established that it furnishes opportunities for youth, this will do much to stabilize our society. We shall not regain our export food markets on the old scale. We are no longer the principal source of cheap food. Moreover, all western Europe, our great customer in the past, now protects its farmers not only for military reasons but in efforts to keep up birth rates and preserve social stability. We, too, need to establish our farmers for the same reasons. When I first read of population problems, the estimates of maximum population in this country ran to such figures as 200,000,000 about the year 2000. Now they run as low as 145,000,000 in the year 1945. Today it takes our farmer surplus to maintain our city populations and the growth factors left are in age redistribution and in the villages.

So long as the birth rates in farms and villages maintain high differentials over the cities, we have this additional reason for keeping these groups in stable condition. We are far from ready for the social and economic problems of a static or declining population. The only hope of establishing the farmer lies, I believe, in close coöperation among biologists, chemists, and industry in efforts to direct the attention of science more intensively to this problem and then to make practical use of the accomplishments of science.

To make such closer coöperation possible, we need, from responsible scientists, better organized, more frequent, and more imaginative presentations of the probable direction of chemical progress. Pure science may to advantage drop some of its aloofness and let us dream dreams and see visions with reference at least to the near future, so that we may be better prepared for social change consequent on scientific change. I do not mean mere popularization. I mean more in the way of responsible, continuous presentations for serious nontechnical readers.

One further point. We need social mechanisms for accomplishing these results. Even in the natural sciences, logics rarely work out to progress except through loyalties and sentiments. Because this is so, logics, before they can be effective, require organized social mechanisms apt to bridge the gap between logic and sentiments.

(Concluded on page 202)



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SECURITY vs. PROGRESS

(Concluded from page 201)

The great difficulty arises out of specialization. On the one hand, the growth of knowledge and limits on human capacity force a high degree of specialization on the whole intellectual world. Our universities constantly devise new subdivisions intended to give the specialist a chance to master his field. Unfortunately, this subdivision too often destroys the breadth of viewpoint necessary to larger integrations even within the special field and assures amateurishness in excursions outside the specialty. We need far greater attention to the creation of mechanisms of contact which may grow organically out of recognized mutuality of interest and involve men of diverse specialties. Chemistry, biology, and the social sciences will not work together without organization to make contacts natural.

I insist both on the creation of the mechanisms and on the organic growth of personnel as mutuality of interest becomes recognized. It is not enough to say "What Ho! Here are funds. Let us coöperate." The first step must be recognition of mutual interest, the logic of the situation. Then the mechanism of coöperation, the social organism, will be essential to the effective carrying out of that logic. Real progress in directing the aims and energies of science in such ways as I am suggesting will depend on the creation in our universities of mechanisms of contact between science and business, politics, and the social sciences generally, and on the organic growth of a spirit of coöperation in university groups which include scientists, social scientists, and students of administration.

I suggest that science needs to relate its objective of the Increase of Human Knowledge more definitely to the social progress of mankind and that it realize the grave dangers which arise from the impact of scientific knowledge. I emphasize the halt in scientific progress which may arise out of the nature and sentiments of man, the social animal. I urge that scientists can aid the effectiveness of social sciences by the wise direction of their own efforts in their own fields. In this way they may substantially simplify the task which faces social science and give much needed time within which we may attain better understanding of, in Elton Mayo's phrase, the Human Problems of an Industrial Civilization. If in the end social science is to make any real contribution to stability and progress, it must develop a theoretical point of view which pays far more attention to human behavior and the variety of forces which affect such behavior. Just as important, it must develop concrete training useful for men of affairs and politicians, who must not only think in terms of facts, statistics and trends, but must both think and act on inadequate facts with primary reference to the sentiments and emotions of groups or masses of men. It needs the help of natural science in a joint search for an equilibrium between security and progress.

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THE INSTITUTE GAZETTE

(Continued from page 194)

realization on the part of the student that his chances of obtaining a position and for later advancement are materially enhanced if he has successfully completed one or more years of graduate study and research. (4) The recognition on the part of personnel directors that the training in research and independent thinking acquired by graduate students warrants giving them preference in appointment over students who have completed only an under-graduate course.

The problem of financing a period of graduate study is a very serious one for most graduate students. To meet this situation the Institute greatly needs additional endowed graduate scholarships and fellowships. This year 236 graduate students were assisted from scholarship funds, and 85 from the Technology Loan Fund, which has proved of the greatest assistance during the present period of depression. With the shrinkage in income from endowed scholarship funds, many students in the Graduate School would have been unable to attend this year had it not been for additional scholarships made available by the Executive Committee from general funds.

The coöperative plan of exchange of graduate students between Harvard University and the Institute of Technology, arranged some years ago by President Lowell and President Stratton, by which students in either institution may take graduate courses in the other institution without payment of additional tuition fees, is working most satisfactorily. At present 14 Harvard students and ten Institute students are availing themselves of the exceptional opportunities thus afforded. Members of the Staff and graduate students are invited to participate in many of the seminars and colloquia offered in both institutions. The most important development of the year, one far-reaching in its effects, has been the opening of the Graduate House [See the Review for November].

It is the policy of the Committee on the Graduate School to build up the school on the basis of quality and attainment of its students and not on numbers. Admission is strictly selective and only students of high academic standing in their undergraduate work are admitted either from the Institute or from other colleges. A high standard of accomplishment is required for all advanced degrees. Admission will be limited in any department to such numbers as can be provided with adequate research facilities. The new Eastman Research Laboratory is already rapidly approaching a condition when such a limitation of numbers in the fields of Physics and Chemistry may become necessary.

4. SAMUEL C. PRESCOTT, '94

Dean of Science

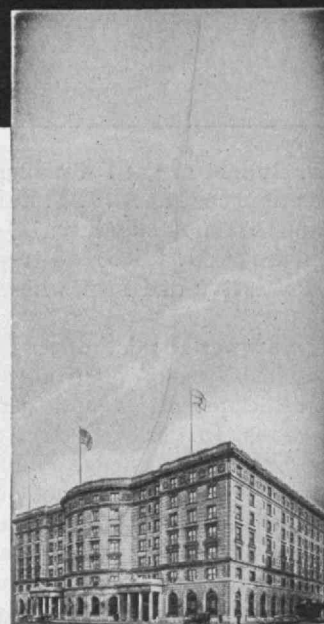
Dean Prescott as the last speaker had four questions: (1) What is the trend of thought in the emphasis on principles and processes? (2) Is it true that our curriculum is over-complex? (3) How much freedom of election and substitution is available (Continued on page 204)

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THE INSTITUTE GAZETTE

(Continued from page 203)

to a student of good standing? Is there any validity in the criticism that M. I. T. insists on a lock step? Do we examine students unduly? (4) Does the educational experience at M. I. T. tend to produce leaders in science and industry and men whose ideals are to serve humanity?

To answer about the trend of thought we go back to President Rogers' plan of 1846 for the inculcation of scientific principles and demonstration of practical processes. In the early days of Technology, there was less scientific knowledge available than today and great importance was placed not only on principles but also on processes and laboratory practice. With the passage of time has come a great increase in the body of factual truth that has vastly broadened the knowledge of principles and simultaneously the laboratory courses have gradually changed to illustrate principles instead of demonstrating processes. What were formerly regarded as separate fields of activity in applied science are now interrelated. Every course at Technology makes use of principles that are generally looked upon as belonging specifically to some other department. To sum up, the trend of our instruction is to place greater emphasis on principles and to use applications for developing the student's power of analytic thought, accuracy, and manipulative dexterity. After all a student learns best by doing.

Questions two and three were considered together. The curriculum must be broad to meet our objectives. There are about 30 programs of prescribed study, but these are not rigid and flexibility is secured (1) by electives, (2) by allowing the student to make substitu-

tions, and (3) by registration in the division of general science or general engineering. In general the faculty should be in a better position than the student to decide what course of study will best fit him for his future career. There has been a natural growth in the number of subjects taught. Comparing the two school years of 1913-14 and 1933-34, the following figures in round numbers show the rise for the four major divisions: In science from 210 to 380; in engineering from 205 to 605; in architecture from 20 to 95; and in cultural lines from 45 to 90. Much of this increase is due to graduate subjects and a separate diagram for the same two years on the basis of each department showed that, while undergraduate subjects had remained practically unchanged in some departments, or at most had doubled, or possibly trebled, in some other departments, the graduate subjects had increased two, three, four, or even five fold. With this increase has come some duplication of instruction in different departments, and there is a move at present to bring these entities into better coördinate relations as parts of a broader subject. Thus the future trend will be toward a smaller number of subjects presented as coördinate parts of a field in which certain principles are basic and capable of application in diverse ways or, in other words, to emphasize principles over details. The actual situation today is that there are 652 undergraduate subjects and 522 graduate subjects and electives against 357 undergraduate courses and 99 graduate courses and electives in 1913-14. However, a study of the number of subjects taken per term per student in each department shows that in 1913-14 no student carried less than eight subjects and many carried up to ten. While in 1933-34, the student load has been reduced so that all have not over eight subjects and some are down to seven. The criticism that Technology insists on a lock step has been amply refuted by the foregoing evidence of flexibility of courses. In regard to an undue number of (Concluded on page 206)

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(Concluded from page 204)

examinations, the record shows that for the two decades prior to 1910 there was an examination of three hours duration in practically every subject. In 1910 faculty rule limited the number of examinations in any term to six; in 1922 the limit became five for the first term and in 1925 this was extended to cover any term. Since 1928 only three examinations are allowed in the second term of the fourth year. Some thought has been given to the use of the so-called comprehensive examination.

Visiting Committee Report of the Department of Hygiene*

DURING the period from July 1, 1932, to May 1, 1933, the Department received 16,922 visits, subdivided as follows: surgical, 5,949; medical, 6,207; excuses, 1,653; complete physical examinations, 824; physical reexaminations, 1,779; contagious, 10; visits after hours to hospital, 500.

Physical Examinations require the assistance of extra examining physicians because several hundred men must be examined within a short period of time. All men registered as undergraduate students and new graduate students must have made their appointments before November 1. Members of the freshman class and those entering competitive sports must have a physical fitness card, signed by the Medical Director, before being allowed to enter Military Science, physical training, or athletics. In order that these physical examinations be completed, it is necessary that the office force work at top speed for several weeks.

Results of Physical Examinations. A special study of 49 men who presented signs of heart trouble was made by a heart specialist, Dr. Howard B. Sprague. Many of these cases, as was suspected at the first examination, were functional, but 19 were listed by Dr. Sprague for further study by x-ray, cardiograph, and so on. As no funds were available for this further study, letters were sent to the parents, telling of Dr. Sprague's findings and

* The Visiting Committee which made the above report consisted of Harry J. Carlson, '92, Chairman; W. S. Forbes, '93; H. E. Worcester, '97.

his recommendations for more extended observations, together with a statement of the cost of this work. Some letters have been received directing the student to go to Dr. Sprague as a private patient and doubtless others will seek further consultation as conditions permit. Forty-nine x-rays of lungs were taken by Dr. A. W. George: 24 because of a personal history causing a suspicion of tuberculosis of the lungs; 14 because of a family history of tuberculosis; 11 of Asiatic students. Two cases of *active lung tuberculosis* were found and the students were required to leave school. Five *positive cases* were found.

Thus 10% of the x-rays showed evidence of tuberculosis, which indicates the value of this method of diagnosis. Positive findings in 27% of the Asiatic students emphasized the susceptibility of Asiatics to tuberculosis and the wisdom of making x-rays of the chest a part of the examination of all Asiatics.

Physical Fitness Class. Because of being underweight, 56 men were assigned to this group and 52 of the men successfully completed their mid-year examinations to finish the year. Members of the group were weighed once a week and given instruction in subjects pertaining to health and gaining weight by lectures on the proteids, fats, and carbohydrates of foods ordinarily used. Mineral salts and vitamins found in food and their relation to growth and health were also discussed, as well as the influence of sleep, exercise, fatigue, tobacco, and alcohol on health and physical development.

An analysis of the personnel of the class is interesting and instructive. As a whole, it was 1,388 pounds underweight, or an average of 25 pounds per individual. The average gain per man during the period was seven pounds, the highest 19; not a single individual failed to make a gain; the class as a whole *regained* 28% of its underweight. A study of the 25 men who failed to gain the average of seven pounds disclosed that 36% had organic trouble.

Infirmiry. Three hundred and thirty-five bed cases were treated in the hospital and 500 out-patients were treated there in the hours after the First-Aid Room had closed. These men lost an average of four days each but a much longer period of time would have been necessary if they had not been sent to the Infirmiry immediately.

Epidemics. Grippe colds numbering 842 were treated in the First-Aid Room. From January 5 to 23 the Emergency Ward was opened to care for the overflow from the Infirmiry and the Solarium was also pressed into service.

However, not even a threatened epidemic of contagious disease occurred during the period, undoubtedly because of the strictest scrutiny and precautions of isolation. For example, a student living in a fraternity house developed measles. He was sent to the Haynes Memorial Hospital and for the following week the members of the chapter house were checked daily by one of the clinic doctors. No further cases developed.

Medical Surveillance has been maintained constantly during the 24 hours of each day, including Sundays and holidays, by the Department. Many serious illnesses have been diagnosed and treated, and several acute surgical emergencies have arisen and been relieved by operations. The doctors have made over 300 night calls.



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❑ To ARTHUR E. KENNELLY, professor emeritus of electrical engineering at Harvard and M. I. T., on being awarded the Edison medal for 1933 by the American Institute of Electrical Engineers for "meritorious achievement in electrical science, electrical engineering, or electrical arts."

❑ To PORTER ADAMS '14, on being elected Acting President of Norwich University at Northfield, Vt. Mr. Adams has been President, director, or chairman of more than 50 organizations, and is now chairman of the board of the National Aeronautical Association.

CWA, NRA

❑ The following Technology men have been appointed to positions in the Civil Works and Recovery Administration:

❑ HARRY L. MORSE '99, West Roxbury engineer, chief purchasing agent for Massachusetts.

❑ FRANK D. CHASE '00, executive director in the state of Illinois.

❑ WILLIAM G. PERRY '07, member of a committee of seven to direct a national historic building survey, which will co-operate in formulating plans and directing the employment of about 1,200 architects.

❑ ARTHUR C. HARDY '18, professor in the Department of Physics at M. I. T., one of three government representatives on the Code Authority for the photographic manufacturing industry.

A.A.A.S.

❑ At the 93rd meeting of the American Association for the Advancement of Science and Associated Societies held in Boston, December 27 to January 2, the following men associated with Technology took part:

❑ *Demonstrations and Illustrated Lectures:* ROBERT E. NAUMBURG '16, the use of his invention, the Visagraph, which makes it possible for the blind to read ordinary print. *General Sessions:* Dr. KARL T. COMPTON, President, and Dr. HARLOW SHAPLEY, Corporation, addresses of welcome at the opening meeting. Rumford Medal presented to Professor Shapley, who addressed the meeting on "The Anatomy of a Disordered Universe." *Special Conference of the Committee on the Place of Science in Education:* RALPH C. BEAN '19, leader of the discussion on the Science Teacher's Scholarship and Professional Training.

❑ *Special Programs:* Symposium on the Chemical Revolution — Economic Readjustment Due to Changes in the Chemical Industry, CHAPLIN TYLER '23, "Nitrogen"; ARTHUR D. LITTLE '85, "Plastics" (see front section). Joint Session of American Society of Parasitologists and Section N, A.A.A.S., HENRY PINKERTON '18, "Rickettsiae in Tissue Cultures."

❑ *Mathematics:* WYATT H. INGRAM '22, "On the Dynamical Theory of Electrical Commutator Machines." JAMES G. ESTES, Staff, "The Lift and the Moment of an Arbitrary Aerofoil Joukovsky Potential," also "Conformal Mapping with Applications to Aerofoil Theory." EBERHARD HOPF, Staff, "Remarks on Causality and Probability." NORBERT WIENER, Staff, "The Brownian Motion." PHILIP FRANKLIN, Staff, "Derivatives of Higher Order as Single Limits," also "Geodesics of Polyhydryal Surfaces."

❑ *Physics:* HAROLD L. HAZEN '24, Staff, "Servo-Mechanisms." JAYSON C. BALSBAUGH '24, Staff, "The Inherent Power Factor of Air Condensers and the Limits of Power-Factor Bridge Measurements."

LOUIS B. SLICHTER, Staff, "Experiments Relating to the Study of the Electrical Resistivity of the Earth's Crust at Depth."

EDWARD S. LAMAR and OVERTON LUHR, Staff, "A Convenient Proton Source."

NORRIS E. BRADBURY, Staff, "Negative Ion Formation by Electron Attachment."

ROLLAND M. ZABEL, Staff, "Scattering of Molecular Rays in Gases." ELLIS A. JOHNSON and LOUIS HARRIS, Staff, "Disintegration of Sputtered Deposits."

HENRY M. O'BRYAN, Staff, "Evaporation Technique for Highly Refractory Substances." CLARENCE E. BENNETT, Staff, "Precise Measurements of Dispersion in Nitrogen," also "College Transfer Students at the Massachusetts Institute of Technology."

WALTER ALBERTSON, Staff, "Preliminary Results on the Analysis of the Arc Spectrum of Osmium," and with GEORGE R. HARRISON, Staff, "Arc and Spark Spectra of Cerium." JOSEPH C. BOYCE, Staff, "Wave-Length Standards in the Extreme Ultra-Violet." BERTRAM E. WARREN '24, Staff, "The Atomic Arrangement in Vitreous SiO₂ and GeO₂," and with NEWELL S. GINGRICH, Staff, "The Interpretation of X-Ray Diffraction Curves of a Fluid from a Gaseous to a Liquid State." H. W. B. SKINNER and H. M. O'BRYAN, Staff, "Soft X-Rays and Energy States of the Conduction Electron."

American Association of Physics Teachers. President COMPTON, "A New Outlook for Physics." HANS MUELLER, Staff, "Experimental Demonstration in Molecular Physics."

American Meteorological Society. C. G. A. ROSSBY, Staff, "On the Formation of Solenoids in the Atmosphere." J. BJERKNES, Staff, "Atmospheric Convection." HENRY B. HARRIS, Staff, "Broadcast of Upper Air Meteorological Observations from M. I. T. Airplane in Flight." KARL O. LANGE, Staff, "On Ice Formation on Aircraft."

GREENLEAF W. PICKARD '11, "Variations in Ultra-High-Frequency Radio Transmission and Possible Correlation with the Weather."

❑ *Chemistry.* ALLAN W. ROWE '01, "The Energy Exchange in Pituitary Dwarfs and Giants," also an anthropology lecture

on "The Influence of Abnormal Sitting Height Indices on Weight and Lung Volume Predictions." BURNHAM S. WALKER '27 and ELISABETH WALKER, Evans Memorial, "Rapid Estimation of Alkaloids in Body Fluids."

❑ *Astronomy.* JOSEPH C. BOYCE, ANDREW MCKELLAR, Staff, and DONALD H. MENZEL, Harvard, "The Solar Corona."

❑ *Geology.* IRVING B. CROSBY '17, "Extension of the Bethlehem, N. H., Moraine." FREDERICK K. MORRIS, Staff, "The Date of the Dinosaur Eggs," also "The History of Geology and Mining in the Colonies."

❑ *Zoology.* CHARLES H. BLAKE '25, Staff, "The Phylogeny of the Cirripedia."

❑ *Metric Association.* CHESTER L. DAWES '09, "The Advantages of Metric Weights and Measures in Electrical Engineering."

GORDON M. FAIR '16, "The Metric System in Hydraulics."

❑ *Engineering.* DUGALD C. JACKSON, Staff, address of retiring Vice-President of Section M, "The Origins of Engineering."

Institute of Radio Engineers. EMORY L. CHAFFEE '07 and C. N. KIMBALL, Harvard, "A Method of Determining and Operating Characteristics of Power Oscillators."

F. S. DELLENBAUGH, Jr., '21, "The Design of Smoothing Circuits for Rectified Alternating Currents." WILLIAM T. HALL, Staff, "Measurement of High-Intensity Sound Fields." E. A. JOHNSON, Staff, Round Hill Division, "Measurement of Temperature in Sound Waves." W. L. BARROWS, Staff, Round Hill Division, "On the Oscillations of a Circuit Having a Periodically Varying Capacitance." C. NEITZERT, Staff, Round Hill Division, "Thermal Agitation Voltages in Resistances." JAMES K. CLAPP '23, "Commercial Developments in Frequency Standards and Measuring Equipment."

❑ *Education.* RICHARD H. FRAZIER, Staff, "An Experiment in the Honors Treatment of Students in Electrical Engineering."

❑ *Deaths*

❑ WILLIAM T. HENRY '70, on July 22.

❑ STEPHEN DECATUR '77, on January 6.

❑ NATHANIEL G. ROBERTSON '85, on December 19.

❑ EVERETT MORRIS '85, on December 27. (See front section for account.)

❑ H. B. MERRIAM '86, on December 21.

❑ FRANK L. DAME '89, on December 30.

❑ A. E. TRUESDELL '89, on October 26.

❑ SAMUEL N. BRAMAN '92, on December 5.

❑ ARTHUR V. CURTIS '97, on December 17.

❑ EDWARD F. MORRILL '98, on September 2.

❑ CORA S. HOPWOOD '00, on December 11.

❑ GEORGE BRICK '25, on December 18.

❑ EDWARD A. MICHELMAN '29, on December 25.

❑ W. B. THOMAS '29, on December 14.

❑ ROBERT B. HARKNESS, Jr. '31, on December 17.

NEWS FROM THE CLUBS AND CLASSES

CLUB NOTES

Technology Club of Chicago

The Chicago Club planned a dinner on December 28, at which all undergraduates and prospective students who were in this vicinity for the Christmas season were invited. The speakers at this dinner were Joel I. Connolly '16, Chief of Bureau of Sanitary Engineering, City of Chicago, and Frank D. Chase '00. Mr. Connolly spoke on "A Journey to the Holy Land," and Mr. Chase outlined the activities of the Government's C.W.A. in this district, for which he has recently been appointed local chief engineer.

The Chicago Club is undertaking a new activity; namely, that of trying to bring together Tech men who need jobs and Tech men who have available positions. As a means of carrying out this plan, the club's executive committee appointed N. H. DeFoe '25 to be in charge of the work. A notice is being sent to all members advising them of the activity and we are in hopes that the service may be of advantage to all. It is not our purpose to conflict in any way with the work of the Division of Industrial Coöperation but we believe that we can do constructive work among our own members in supplementing the work of the Cambridge office. — WINFIELD I. McNEILL '17, *Secretary*, Colgate-Palmolive-Peet Company, 919 North Michigan Avenue, Chicago, Ill.

Rocky Mountain Technology Club

The December meeting of the club was held at the home of B. E. McKechnie '02. The evening was devoted to various card games, chiefly bridge and poker. Several new members were present: R. G. Rolin '30, W. F. Swanton '33, John C. King '33, Ingvald Madsen '33, I. T. Malmstrom '29, and John B. Drisko '27. These new members are with the Bureau of Reclamation in Denver. Arthur Hill '23, who is also with the Bureau of Reclamation, is again with us after about a year's absence.

One of our members, Dr. Severance Burrage '92, read a paper ("The Sanitary Supervision of Food Handling Establishments") at the annual meeting of the American Public Health Association, October 18. C. H. Hanington '91, President of the Denver School Board, was injured in an automobile accident early in November. — MAXWELL PARSHALL '28, *Secretary*, 926 Akin Avenue, Fort Collins, Colo.

Technology Club of Shanghai

The tenth meeting was held at the American Club on November 24. The hosts were H. H. Needham, T. C. Wany, L. C. King, T. Y. Sze, Y. H. Li, M.

Chow, and H. K. Chow. Thirty-two members attended. In the absence of the President, the Secretary acted as chairman. The meeting was called to order at nine P.M. The chairman read a telegram from the President at Nanking regretting his inability to attend the meeting. The minutes of the last meeting being read and accepted, the chairman appointed a committee, comprising T. K. Kao, L. C. King, and H. K. Chow, to nominate candidates for 1934 officers. A letter from Dr. Allan W. Rowe appealing for help for the alumni athletic fund was presented to the meeting. It was unanimously voted that 50 U. S. dollars out of the accumulated alumni fund be sent over as the club's contribution. The chairman presented H. R. Greatwood '24, of Union Oil Company, as the speaker for the evening. Mr. Greatwood gave an interesting talk on petroleum production. A movie was shown illustrating the history of oil production, drilling, refining, and marketing of oils. So much interest was shown by the audience that a question period was allowed by Mr. Greatwood. The meeting adjourned at 10:45 P.M. — M. C. CHAN '26, *Secretary*, P. O. Box 434, Shanghai, China.

M. I. T. Club of Western Pennsylvania

The club celebrated the repeal of the Eighteenth Amendment on December 5 with a dinner meeting at the University Club. Our speaker of the evening was Mr. C. J. Campbell of the Westinghouse Lamp Company.

Mr. Campbell has recently completed a two-year lecture tour of the country, speaking on the subject of "Light." In his talk to us he described and demonstrated all the steps in the evolution of the modern incandescent lamp, from vacuum types to modern gas-filled types. He explained the advantages of various concentrations of filaments and demonstrated all the types of incandescent lamps in use today. He also demonstrated a sodium vapor lamp and other unusual light sources. He then went into the general aspects of good lighting, explaining glare and showing the apparent increase of the speed of vision with the increase of light intensity.

On Friday evening, December 8, members of the club and their families were guests of Dr. Baker of the Carnegie Institute of Technology at Carnegie Tech's College of Fine Arts Theater. The Drama School gave one of their usual splendid productions in presenting Noel Coward's play, "The Young Idea." Over 40 members and their families and friends were in the audience. — C. M. BOARDMAN '25, *Assistant Secretary*, Duquesne Light Company, Pittsburgh, Pa. SAMUEL J. HELFMAN '24, *Secretary*.

M. I. T. Club of Western Maine

A most enjoyable meeting of the association was held at North Yarmouth Academy, Yarmouth, Maine, on Saturday evening, November 25, the club being entertained by Stanley Hyde '17, Principal of the Academy. The guests were given a surprise that was not on the schedule. This took the form of a chimney fire in the girls' dormitory, where supper was to be served. Colonel Locke was concerned for the biscuits, but his fears were soon allayed, for the class in domestic science put on a feed which will long be remembered.

After the supper the ladies adjourned to the parlor above to enjoy cards and dainties prepared by Mrs. Hyde, while the men conducted the annual business meeting. Stanley Hyde '17 was elected President and Alfred E. B. Hall '15 was re-elected Secretary. The other officers, such as there may be, are to be appointed by the President. Colonel Frank L. Locke '86 was then introduced, and he told us about some of the things that are going on at the Institute, and explained how we could help by encouraging the right class of students to choose Tech as their alma mater. Dr. Jerome C. Hunsaker '12, new head of the Department of Mechanical Engineering, afterward conducted a most interesting forum, relating not only to the affairs at the Institute, but to the ever-present economic situation now besetting the country. Following the meeting, we rejoined the ladies and went across the street to inspect the new educational building designed by Lester I. Beale '18, of Portland, and to enjoy dancing in the gymnasium.

With the notice of the meeting was enclosed an application blank distributed by the Maine Association of Engineers, which organization is listing all the unemployed engineers in Maine, and is co-operating with the Public Works Administration to place unemployed engineers in the government projects throughout the state. — ALFRED E. B. HALL '15, *Secretary*, 94 Beach Street, Saco, Maine.

CLASS NOTES

1875

We have but recently learned that Howe died April 11, 1931. The sketch of Howe's life given below was prepared by our late beloved E. A. W. Hammatt, who for many years was not only our Class Secretary and Treasurer, but also our faithful historian. In April, 1926, he published "Class of '75, M. I. T., 1875-1926," and in its Foreword wrote: "In preparing this issue I have given a personal sketch of each man so far as I had data therefor." On page 27 of this "Class Directory" (a name which he himself gave it) we find

1875 Continued

the following information: James Murray Howe was connected with the class during the first year. He was married and had four children. His present occupation (1926) was real estate operator, 10 State Street, Boston; his home address, Fairmount Avenue, Hyde Park, Mass. Howe was a son of James Murray and Harriette Butler (Clarke) Howe, and he was born at Brookline, Mass., January 11, 1854. He obtained his early education in private schools and Phillips Exeter Academy; married on May 25, 1887, Elizabeth Hall; and their children are: Barbara Murray, James Murray, Archibald Murray. He was a member of the St. Botolph and Exchange Clubs. His favorite occupations were travel and study of superficial architecture.

I knew Murray Howe personally and always found him affable, genial, and companionable. He owned vacant land in Milton, and about 1895 I bought of him a lot of about two acres near his home on Smith Road, which runs from Brush Hill Road to Beacon Street, hoping to build upon it. Later I found it would not be convenient for my business (automobiles were not so plentiful then), so I went to him and told him so. Without ado, he kindly volunteered to relieve me of the land at cost and did so. This, I think, was a fine example of his character.

Later he became interested in large transactions, not only on his own account, but in connection with others, and I believe the universal feeling among those who knew him was one of friendliness, and "hail, fellow, well met!" — JOSEPH W. HOMER, *Secretary*, 38 Webster Place, Brookline, Mass.

1883

The Secretary sent out a plea to such members of the class as he thought were still active, and is glad to report the members of the Class are doing as well as can be expected. Some interesting letters received are presented herewith.

Horace Gale is still working away at sign boards. It is hoped that the next time any of us happen to drive through Massachusetts, we will find the sign boards conspicuous by their absence. It is suggested Horace would do a good job if he could get through some legislation such as we are having in New Jersey, where sign boards are pretty well taxed away from the sides of the roads. In other words, they have been receiving a dose of Jersey justice. We have received the following letter from Horace: "Sorry I can't send you any tales of high adventure in response to your piteous appeal for Class Notes; but since our reunion, this family hasn't been anywhere or done anything worthy of record, though I have spent some months going to the hospital and recuperating from operations for cataract. I am glad to report that now I can read almost as well as ever.

"The truth is our financial 'anchor to windward' has been in some danger of dragging toward the rocks, and we have had to lighten ship by throwing overboard some of the deck load of luxuries, such as vacations, and so on; but we are

now holding steady, still able to enjoy the necessities of life, and hoping for a favoring change of wind.

"One thing has given me a lot of satisfaction. My long fight for legal restriction of billboard advertising, as chairman of the Massachusetts Billboard Law Defense Committee, is apparently nearing an end. We have finally got the case before the full bench of the Supreme Court, and are awaiting their decision, which we hope will mean victory over the iniquitous and ubiquitous billboards.

"I can send a few notes about classmates: the Bryants are going to Florida in January. Mrs. B's health is better. The Chases are now so delightfully situated in South Hamilton that they don't want to go. Harvey is busy with reforming municipal and national accounting methods and has just had a little set-to with the Mayor of Boston, in which he has apparently succeeded in squelching the hitherto unsquelchable Curley. I am inclosing a clipping from the *Transcript* about it, which Harvey may be too modest to send." We are glad to note that Horace's eye trouble is disappearing and that he is at last successful in his billboard fight.

Chase returned the circular post card sent to the class with characteristic comments; not very voluminous stuff. According to a notice in the Boston *Transcript*, Harvey is becoming quite sarcastic over the repression of his article on "City and Town Reports on Financing."

We wish to congratulate Julien Vose on being the first great-grandfather in the Class. His letter of December 11 follows: "I think I am a few steps ahead of you as I am a Great-Grand-Father. If it had been a boy, they were going to have a sign made 'We do our part' and hang it on my back and make me wheel him out. But it is a girl, so they have let up on me for that job. You know the father of my great-granddaughter has been my chum ever since he could walk. I have had him with me at the two last reunions of our Class, so you have met him. He has traveled with me much in this country and over Europe. We took all of those movie pictures which I showed at the last reunion. This summer we spent in the Canadian Rockies and about Vancouver. We have a number of reels of movies and some stills. The flowers in and about Victoria are most beautiful and I took several reels of Koda color. On the way home we stopped at the Chicago Fair. I was disappointed in comparing it with the Fair of 1893 which was grand."

The following letter from Mark Lawton leads us to believe that he has quite recovered his usual good health and makes us wish that we could have been with him on his trip. "I was very much tied up with getting out some new apparatus in May, June, July, and August, but in September Mrs. Lawton and myself sailed on the *Vulcania* from Boston, and called at the Azores, where we saw the pineapples growing under glass, and at Lisbon, Gibraltar, and Palermo. We didn't go ashore at either Lisbon or Gibraltar, as we had been there a number of times

and were coming back to Gibraltar anyway, but at Palermo we went to Monreale, where there are some of the finest mosaics in the world. We spent an hour there, and then went back to the ship, and we were in Naples the next day, and Patras, Greece, the day following. We were only ashore in Naples for an hour or two, and we didn't go ashore in Patras, as there is very little of interest there to see at the present time, although some of the passengers found a great deal of interest in the Greek wine, and came very near being left. We were 13 days at Dubrovnik, our destination. Dubrovnik is the Yugoslavian name; the Italians call it Ragusa.

"The steamer comes into a shallow channel between the mainland and an island to anchor some two miles from the little town of Gravosa, which is where the customhouse is and only eight or ten minutes' automobile ride to Dubrovnik. We landed there, and had no difficulty whatever with the Yugoslavian Customs, went over and took a car, and very shortly we were in Dubrovnik.

"The mountains at that point come right to the sea, and Dubrovnik lies on the side of the mountain, one side right on the water. People go out of the hotel in their bathing suits, cross the main street, and down right into the water. It is one of the loveliest spots that we have ever seen. . . .

"We autotomiled over to Trebinje, where we saw people in Turkish costumes and Yugoslavian costumes, and so on. Trebinje is in what was called Herzegovine before the War and is interesting. We went through a beautiful palace owned by Count Gozze where his people have lived for 1,200 years, only about 16 miles from Dubrovnik. We spent a most delightful forenoon there, and the treasures which the Count has are simply marvelous.

"Then the following day we took a beautiful steamer, small but perfectly appointed, marvelous meals, and so on, and spent the day on the Adriatic, going to Spalato, or as the Yugoslavians say, Split. We were there three nights and two days. One day we went to Trau, which is an unspoiled medieval city, or very nearly so. In Split are the remains of Diocletian Palace. In fact, the houses were built inside the palace during the Middle Ages, and the palace was a sort of fort.

"Then we took the steamer back to Spain, and spent two weeks there, four days being spent at Ronda, some 60 miles north of Algeciras, which is a marvelous and beautiful place. The hotel itself sits on a cliff, and you can look down over the garden wall about 400 feet into the valley. The Tajo runs through the city, where there was first a Phœnician settlement, then a Greek, and then a Roman. They dug up in the garden of the hotel only a little while ago a Phœnician carving, which was exceedingly interesting. After the Romans the Moors held it for many years, and there is a house on the street level with a tunnel with a winding staircase going down to the river, which was wrought out by Christian captives for the Moors.

1883 Continued

"We had a very pleasant run home from the other side, with pretty fairly smooth weather, and we are now hoping that we shall be able to gather up money enough to again go across next year and explore Yugoslavia still further."

Alexander writes that he has changed his address from Washington, D. C., to 68 Central Avenue, Wollaston, Mass. — DAVID WESSON, *Secretary*, 111 South Mountain Avenue, Montclair, N. J.

1885

George Nye, city engineer of New Bedford is high gun in this grist of news because he has been made Chairman of the Massachusetts Federation of Planning Boards at a recent business meeting of this organization at Worcester. Now that George has got his courage up to trek as far as Worcester, we may have the pleasure of seeing him in Boston at our next Class conclave.

Alex McKim, writing from Munich, Germany, has an apparently justifiable grievance against the German grammar. We say justifiable because Alex did a lot of post-graduate work in Germany, was a champion duelist, and that without a scar, and has always held the Fatherland in high regard. He has deduced as the result of his recent sojourn abroad that, in business matters, the English language stands first, the Spanish second, with the third place open. Germany might have been placed here, but because of her pride she forfeited it and the War, and unless she revises her grammar, her place in the list is problematical. What he says about it seems reasonable, and those of us who flunked in German under that good man, Professor Otis, will heartily agree with him.

He says that the grammar is so difficult that half of the Germans cannot use their own language correctly. The sentence construction brings universal ridicule. Most of the figures of numbers are written in one order and spoken in another, the many terminations of articles, adjectives, and nouns should be simplified, and the different parts of the verb should immediately follow each other.

Alex is our accredited representative in Germany and what he says goes with us. Hitler is probably a bang-up good feller and we are no doubt all wet in our conception of him. The trouble probably is that because of these grammatical idiosyncracies, his statements have been entirely misunderstood, and if Alex succeeds in his contention, '85 will score an international triumph.

And all this reminds us that Dave Baker has reluctantly torn himself away from his summer attachments at Wellfleet, on the Cape, and is hibernating at Rosemont, Pa. Dave is a big man in the steel industry and when the fish quit biting, he yearns for the warmth of a steel crucible.

The following is from the *Engineering News-Record*: "Forty years ago two men were engaged in engineering studies in the West that were destined to open a new chapter in the nation's history. The investigations that Frederick H. Newell

and Arthur P. Davis carried on for the U. S. Geological Survey of water resources in the regions of the great deserts laid the foundation on which later was framed the epoch-making program of federal land reclamation, itself part of that broad policy of conservation of natural resources that was championed by Theodore Roosevelt when he became President, with the aid of such men as Senator Newlands and Gifford Pinchot.

"Frederick Newell led in the strategy and fighting that put the Reclamation Act on the statute books in 1902. If only for this, he would long have a place of note in our record of engineering achievement; but when, upon passage of the act, he became director of the newly organized Reclamation Service, he did no less constructive work in building up the remarkable body of engineers that distinguished the Service. Arthur Davis became his principal assistant engineer at the very beginning, and together they successfully wrestled with the many intricate problems of political, human, and technical kind that the new enterprise brought to the fore. Thus, the brilliant achievements of reclamation stand largely to the credit of these two men.

"That both of them were repaid by governmental ingratitude — Newell was discharged by Franklin K. Lane, Davis by Hubert C. Work, holders of the notoriously political secretaryship of the Interior Department — merely increases their claim to recognition by the engineering community. The spirit and the policies which they brought into being still exist, and, though changed economic conditions now raise critical question about the basic soundness of the federal reclamation enterprise, the work that they did in causing some millions of acres of desert to flourish and blossom will long endure."

On the occasion of Dr. A. D. Little's 70th birthday, on December 15, he was presented with a specially bound and inscribed volume of the Morse Collection of Japanese Potteries by his staff. Actual presentation was made by Roger C. Griffin, Director of Tests, and a member of the Board of Directors of Arthur D. Little, Inc. Mr. Griffin is a son of Mr. Roger B. Griffin, Dr. Little's original partner when the organization was formed as Griffin and Little in 1886. We are indebted to Raymond Stevens '17 for the above item.

The Alumni Office reports the death of Nathaniel G. Robertson on December 19. We have no further details at this writing.

As this goes to press we have received word of the tragic death of Everett Morss. We have been unable to prepare an account of his life for this issue, but you are referred to the front section of *The Review*, the *Institute Gazette*, where an account of "Everett Morss and the Institute" appears. By the time you read this, you will have received a letter from the Secretary announcing Morss's death on December 27th and dedicating our Fiftieth Reunion in June, 1935, to Ev Morss's memory. Prepare to be on hand. — ISAAC W. LITCHFIELD, *Secretary*, 165 Winchester Street, Brookline, Mass.

1889

The Secretary has received the following regarding Bixby which was printed in the *National Nut News*, for September, 1933: "The cause of nut growing and the Northern Nut Growers' Association have suffered irreparable loss in the death of Mr. Willard G. Bixby from Hodgkins' disease at his home in Baldwin, Long Island, N. Y., on August 16, 1933. Mr. Bixby was born July 13, 1868, at Salem, Mass., the son of Henry M. and Eliza (Symonds) Bixby. In 1898 he married Genevieve Cole, who died in 1901. His second marriage was with Ida Elise Tieleke, who survives him together with three children. He graduated with honors from the Massachusetts Institute of Technology in 1889 and remained at the Institute as an instructor in mechanical engineering, later becoming associated with the Pneumatic Dynamite Gun Company of New York, the American Bell Telephone Company of Boston, and he became Vice-President of the reorganized S. M. Bixby Company, manufacturers of shoe blacking, which became a large and highly prosperous business. Following the merger of that concern with another, Mr. Bixby retired from business and devoted his time to experimental propagation of nut trees on his Grand Avenue property in Baldwin, Long Island, collecting approximately 1,000 species and varieties. He was also interested in curly black walnut and bird's-eye-maple woods. Mr. Bixby made many contributions to the literature of subjects in which he was interested. The five acres of land surrounding his house had been purchased at a time when they belonged to the outskirts. Increase of population brought them into an immensely valuable situation where land sold by the front foot, but Mr. Bixby was so devoted to the hundreds of species and varieties of nut bearing plants that were under way for experimental observation that he refused to gain a fortune from the sale of any part of the property. The nature of his work consisted in the first place in collecting as many kinds of seedling and grafted specimens as were available. He traveled extensively over the country in order to see notable trees and to make notes upon their environment in their indigenous habitat. Foreign species were added to the native ones to some extent but the main study related to North American kinds, the idea being to improve our native kinds by cultivation, selection, and hybridization. Grafting material was secured from promising varieties in different parts of the country and this was placed upon seedling stocks in the collection. An extremely valuable part of the work consisted in experimental grafting of some one species upon stocks of other species of a genus, in order to determine the best stocks for propagating any one species or variety. No one else in this country had ever carried out this work in an accurate and scientific way to any such extent. So far as the writer is informed, no one else in any other country had conducted this research in carefully

1889 Continued

planned experiments, with suitable checks belonging to scientific method. He devised a way for determining the nature of the parentage of many nut trees that introduced a question of hybridity or of reversion. By planting the nuts, he secured progeny representing both of the parents — according to Mendelian principles when the question of hybridity came up for discussion. Making new varieties of nut trees by cross pollination had lately engaged Mr. Bixby's deep interest, and the most promising of the hybrids were shared with the United States Bureau of Plant Industry in the plantings at Beltsville, Md. His collection of various species and varieties of nuts will be of great value to some agricultural institution, but at the moment the disposition of this collection is probably undetermined. As Secretary of the Northern Nut Growers' Association, as well as in independent correspondence, the letters, specimens, and notes will have inestimable, permanent value. . . .

The following is excerpted from the Baldwin, N. Y., local paper: "Mr. Bixby was deeply interested in civic affairs. He was a charter member of the Baldwin United Civic Association, trustee of the Baldwin Public Library, Director of the Baldwin Savings and Loan Association, former Fire Commissioner, chairman of the Baldwin Lighting Commission, member of the Methodist Episcopal Church in Baldwin, and organist of the Men's Bible Class, as well as a teacher in the Sunday School. Mr. Bixby's conservative New England training made him a valuable worker for any cause he espoused. He never sought honor and publicity, preferring to do his share quietly and modestly. Besides his wife, three children survive him, Willard F., a student at the M. I. T., Katherine E., just recently graduated from the Baldwin High School, and Ida T., a junior at the Baldwin High School." — WALTER H. KILHAM, *Secretary*, 126 Newbury Street, Boston, Mass.

1891

In our Review notes of last year we mentioned the death of H. C. Daggett, but at that time we had relatively little information regarding his life work. We have since received an account of his life as published by the American Society of Civil Engineers, and give below extracts from this report: "After his graduation, Mr. Daggett took a position as assistant engineer in the office of the Proprietors of the Locks and Canals on the Merrimack River, at Lowell, Mass. His duties in this position gave him a broad foundation for his life work in the development of water power. He became familiar with the details of a great variety of water-wheels and their settings, and various methods of transmission of the power developed. In these early days there were no direct-connected electric generators. He also received thorough training in water measurement and the flow of water through open and closed conduits.

"In 1898 and 1899, he practiced as a consulting engineer, making independent reports and investigations. Among others

were surveys and plans of water-power projects at Marble Falls, Texas, and Huntsville, Ala. In 1899, Mr. Daggett became chief engineer of the Swain Turbine Manufacturing Company, at Lowell. His duties consisted in designing and superintending the manufacture of hydraulic turbines and in acting as sales engineer. In this capacity, he was largely responsible for the design of the turbine settings.

"From 1901 to 1903 he was sales engineer in the Hydraulic Turbine Division of the Holyoke Machine Company, at Worcester, Mass. His duties were similar to those with the Swain Company, with perhaps less attention to detail and more to general design and development. . . .

"From 1903 to the time of his death, he had charge of the New England Office of the S. Morgan Smith Company, manufacturers of hydraulic turbines and allied equipment, as engineer and sales manager. In this position he widened his acquaintance with engineers and builders of hydraulic power plants. He saw the rapid introduction of electrical equipment and the change from the driving of machinery directly, or through various types of drives, by the water-wheel, to the direct connection of generators and the driving of machinery and equipment by motors.

"He had a thorough knowledge of the various types of turbines and the particular conditions they were best suited to fulfill. Few, if any, important developments were made in New England without Mr. Daggett's advice. Because of his exact knowledge of the flow of the various rivers and streams, he was able to be of reliable assistance in determining the possibilities of undeveloped water power. His sound engineering knowledge was greatly valued, also, in improving old power developments. Perhaps his most noteworthy accomplishments were his broad knowledge of the water-power situation in New England and his wide acquaintanceship with hydraulic engineers. Always intent upon securing the very best results, his advice and coöperation were widely sought.

"Mr. Daggett was a man of high ideals in his professional and personal life. He had the marked respect of all with whom he came in contact.

"He was a Life Member of the Winthrop (Mass.) Yacht Club. His chief recreation for many years was associated with the activities of this organization. He was also a member of the Vermont Electrical Association and the Boston Society of Civil Engineers."

Wedding announcements are out for John Putnam's daughter, Priscilla, to Edward W. Vogel, December 9.

Howard and Mrs. Forbes sailed on December 15 on the *Conte di Savoia* for Gibraltar. They will spend the winter in Spain and France and probably will not be back until next June. Their address is care of American Express Company, Paris.

Charlie Garrison writes that he called on the Shattucks in November. Forrest is seriously ill with tuberculosis. Charlie tells of a trip to Julian, not far from San

Diego: "We looked down from a height of some 5,000 feet into a desert valley between some mountain foothills to the shimmer of the Imperial Valley beyond. There was the long blue ribbon of the sea and hazy mountains beyond. We ate our picnic lunch watching the view of the shimmering valley and sea. We returned by a more southerly route through Ramona and Escondido (a fine grape country where we got some of the last harvested). Then back to Oceanside and up the Coast again. The trip was some 250 miles and the day was clear and comfortable.

"On the 27th Mrs. Garrison's sister is to drive my sister out here. They start from Cambridge and go down the Shenandoah Valley, Tennessee, Arkansas, and Texas. They should arrive here about December 10. They will spend a few weeks here and go to Santa Barbara for the winter."

Gorham and Mrs. Dana start on their leisurely round-the-world trip on the Dollar Line *President Monroe*, leaving New York January 25. Here's hoping they have a glorious trip and that we hear from them frequently.

Hanington's son writes that his father was seriously injured in an auto accident and that he is in the hospital but expects to get home for Christmas. This has just come in and we are writing him, and hope that he will be all right again soon.

George Atkinson writes from Limington, Maine: "We have had one three-inch snow storm two days ago and now it is snowing again, so I think winter is nearby. The hunting season is on and our next door neighbor (600 feet away) shot a deer yesterday, a doe of good size, and as I have been on my daily walk of three or four miles, I have heard the guns up through the woods. Mrs. Atkinson is well and enjoying our life in the village and says she would not care to go back to the city. I am in good shape, weigh about 180, and find lots of things to be done."

Barney has had a number of callers and mentions the H. I. Coles, Frank Holmes, and Gorham and Mrs. Dana. Mrs. Cole provided one of her delicious squash pies and Holmes some home-made cider. Frank and Gorham are members of their respective City or Town Planning Boards, Plymouth and Brookline. — Envelopes have been returned from C. B. Pratt, Miami, and Lewis Dunham, New York City. Do you know where they are? — Henry Weed has a new address, 731 West 157th Street, Gardena, Calif. Looks like another addition to our Pacific Coast contingent. We would like to hear from him and will ask Charlie or George to look him up. — Gorham Dana is Treasurer of the Massachusetts Federation of Planning Boards.

George Hooper sends another of his newsy letters to Barney, part of which follows: "It is interesting to hear again from Charley Ricker who will, I hope, write some time more fully of his Cuban experiences and of the general situation there. Our lives have had several close contacts as Ricker's father and mine had been fellow townsmen and friends and both had been mariners. After leaving

1891 Continued

Tech I saw much of Charley in my frequent visits to Buffalo, where he and Viele '91 had an engineering office together. There I met also Ricker's older brother, George A. '86, he also having an office there. George Ricker, whose death in November I noted in *The Review*, did me an inestimable service in Washington during the War, when we were both there, by securing for me a practical nurse to aid my wife when all of our children had the 'flu' and physicians and nurses were almost unobtainable. You can see, therefore, that I have a warm interest in the Rickers.

"Our most recent excitement here was, as the papers have told you, a forest fire of considerable extent. Fortunately it was in an accessible region and a considerable water supply was available, also many trained leaders — the Los Angeles City and County and the U. S. Forestry Dept. organizations and equipment being available — also the men from several C.C.C. Camps. It is one of the humors of the extravagant growth of Los Angeles City that it can have forest fires at several locations within its city limits. The fire burned for about a week and extended over nearly ten square miles. The news reel and newspaper reports of the damage to buildings were considerably exaggerated. It did not get dangerously near Pasadena, but on account of its altitude was plainly in sight. I had a heavy cold which made me wakeful and I could plainly see the progress of the flames as I lay awake in my room.

"By a coincidence as I am writing this, the mail has just brought me a letter from Viele with whom I am corresponding on another subject. He expects to be over here during January and we will try to meet. I formerly had considerable intimacy with him as we lived together for a while in Chicago and he was one of the ushers at my wedding.

"I'm interested to hear that Alley has returned to this Coast and will endeavor to see him — especially should he come up to the New Year game. Our house is but a few minutes walk from the Rose Bowl and many of our friends leave their cars here and walk down to the Bowl while others stay around and listen in on the radio. We always keep open house on New Year's Day and usually have a houseful."

The sympathy of the Class is extended to Homer and Mrs. Goodwin on the recent death of their only son, Harold. He was married but had no children. — HENRY A. FISKE, *Secretary*, Grinnell Company, 260 West Exchange Street, Providence, R. I. BARNARD CAPEN, *Assistant Secretary*, The Early Convalescent Home, Cohasset, Mass.

1893

The Corps of Engineers, United States Army, which has jurisdiction over the Cape Cod Canal, has recently awarded contracts for the building of three large bridges to replace existing inadequate bridges now spanning the waterway, this being the first step in an extensive improvement of the Canal. That these

structures will bear the imprint of the training of Technology's Department of Civil Engineering is evident from the fact that Tech men, as consultants to the War Department, are in charge of design and supervision of construction under the general direction of the United States District Engineer Officer at Boston. One of the new bridges is to be a single track, vertical lift railroad draw-bridge of 540-foot span. For this bridge at Buzzards Bay, Parsons, Klapp, Brinckerhoff and Douglas of New York are consultants and Eugene L. MacDonald '13 is the bridge engineer. The other two bridges are highway structures located at Bourne and Sagamore. For these the consultants are Fay, Spofford and Thorndike, an "All-Technology" firm, whose membership includes, besides Fred Fay and Charles Spofford of the Class, John Ayer '05, B. A. Bowman '09, C. A. Farwell '06, and R. W. Horne '10 (Sturgis Thorndike '94 having died in 1928). The Assistant Secretary is no bridge expert and is certainly no authority on contract bridge or bridge contracts. However, after diligent investigation, he learns that these two highway bridges will be the largest of their kind in New England. They are to be the same clear height above high water, 135 feet, as the Brooklyn Bridge. In each the channel span, 616 feet in length, will rise in graceful arched form to a height of 274 feet (or nearly 50 feet higher than Bunker Hill Monument). Each bridge will have a roadway 40 feet wide and one sidewalk, and considering the sightliness of their elevation as compared with the relatively flat country of the Cape, they should be popular scenic routes for motorists as well as inviting to pedestrians from neighboring villages who wish to view the beauties of the Canal on a moonlight summer's evening. The bridge at Sagamore will have a total length of 1,833 feet, that at Bourne a length of 2,684 feet. In each bridge the "channel span and the two flanking spans are identical and consist of a three-span continuous truss structure 1,400 feet in length." (The reporter does not guarantee the accuracy of the quotation.) A notable feature will be the unusually massive concrete abutments. That "satisfaction will be guaranteed" the public in the matter of appearance is assured as these bridges are receiving the personal attention of Ralph Adams Cram, internationally known architect, whose firm of Cram and Ferguson is associate to Fay, Spofford and Thorndike on architectural features. (G. B. G.)

Theodore T. Dorman of Upper Montclair, N. J., a graduate in chemical engineering, who has met success as a patent lawyer, commission merchant, business man, and trustee, evidently finds his chief delight in the work of the Boy Scouts, with which he has been actively identified since 1912. Dorman, never very athletic in games requiring "a good pair of eyes," was laughed at by his associates in the early days of the Montclair Union Congregational Church, where he taught a Sunday school class, when he announced that he was going to "do some camping."

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The minister had formed a Scout troupe and asked Dorman to help him. "I got into it and the glue stuck to me," he recently explained reminiscently. Long a scoutmaster, in 1931 he was made Scout commissioner for a considerable district in New Jersey, without being consulted, while he and Mrs. Dorman were traveling in Syria. It had been Dorman's boyhood intention to study colors and the dyeing of textiles because his father was President of Amory, Browne and Company, wholesale dry goods commission house of Boston and New York. Hence his choice of the chemical engineering course at Tech. Chance diverted him to the practice of patent law instead, and today he is a registered attorney with license to practice in both federal and state courts. Shortly after his graduation with the Class, Dorman passed the civil service examination and was appointed to the United States Patent Office as fourth assistant examiner, later to the place of third. Meantime he took the course in general and patent law at the Law School of Columbia University, now George Washington University, receiving the degrees of LL.B., LL.M., and M.P.L. and being admitted to the Bar of the District of Columbia. Returning to New York in 1899, he joined the staff of the law firm of Wetmore and Jenner, and shortly afterward was admitted to the Bar of the Supreme Court of the State of New York. In 1902 he joined his father's concern, from which he retired in 1910. Since 1913 he has served as executor and trustee of his father's estate and has given time to varied business interests.

J. Howland Gardner brought to a close his three years' service as President of the Society of Naval Architects and Marine Engineers in December, 1933. As head of this national organization, Gardner has actively and forcefully presented the need of a modern American Merchant Marine to replace the hastily built wartime emergency fleet, the great bulk of our American tonnage, which already is obsolete and which cannot compete in the world's foreign trade against the modern post-war constructed ships of Great Britain, Germany, and other maritime nations, except through heavy government subvention. The address of President Gardner at the Forty-First Annual Meeting of the Society on November 16 and 17, 1933, is one which should be given wide publicity and taken to heart by the American public if this country is to retain even a small share in the transport of the world's foreign trade. Gardner has devoted his whole life since his graduation from the Institute to maritime work, at first in the lighterage department of the New York, New Haven and Hartford Railroad and later at the head of the New England Steamship Company (the popular Fall River line), in which latter position he followed in the footsteps of his father. During the War he rendered able service as consultant to the Navy Department, as a member of the Board of Surveys and Consulting Engineers of the U. S. Shipping Board in charge of reconditioning and putting in commission

1893 Continued

German and Austrian ships taken over by that Board, as special representative to the Peruvian Government, charged with examination and appraisal of all enemy tonnage in Peru and of negotiations with the Peruvian Government for taking over such tonnage, and in general charge of repairing and putting into commission vessels for United States Service.

Henry W. Nichols, in November, 1933, was appointed Acting Curator of Geology of the Field Museum of Natural History of Chicago. Nichols and Miss Ballard (who died in 1897) were the two members of the Class to be graduated in the then newly established Course of Geology. For a year following his graduation Nichols was assistant instructor in geology at the Institute. In 1894, as a geologist, he joined the staff of the Field Columbian Museum which was established as a permanent institution during the World's Columbian Exposition in 1893, the name of which later was changed to its present form. During his nearly 40 years' service with this well-known institution, Nichols has given numerous lecture courses and he has written extensively on geological subjects for many scientific publications. He was honorary special agent, Department of Mines and Metallurgy, United States Commission to the Paris Exposition.

George W. Stose, after graduating with the Class in civil engineering, returned to the Institute for a year of geology, following which he secured an appointment in the United States Geological Survey field force in 1894. His entire life has been given to the work of this survey. His most notable recent work was in directing the work of more than 100 scientists who for five years have been engaged in the preparation and completion of the geological map of the United States, which was published in 1933. This work sums up a century of geological research in this country. On a scale of 40 miles to the inch, the map depicts, by colors and patterns, the distribution of the rock groups and formations that constitute the foundations of this country. The undertaking was of such interest as to be the subject of a special article, "Mapping our Foundations," in the September 23, 1933, issue of the *Literary Digest*.

The Class suffered the loss of three members during November and December, Samuel N. Braman, Francis W. Hight, and George E. Merrill.

Samuel Noyes Braman, who died December 5, was born in West Newton, August, 4, 1869. While he was still a small child, the family moved to Wayland, the home of his mother's family since the original settlement of the town. He was graduated with the Class in the mechanical engineering course, after which he was employed first by the Associated Factory Mutual Insurance Companies of Boston; then by the motive power department of the Boston and Maine Railroad, during which time he resided at Wayland; and afterward by the Westinghouse Machine Company,

with which concern he was located, first at that company's Boston office and later at Philadelphia. On his return to Boston, he became associated with the late Everett Morss '85 and Henry A. Morss '93, as manager of the Morss and Whyte Company in Cambridge until that company was absorbed by the Simplex Wire and Cable Company, with which concern he was connected until April, 1933, when he retired on account of ill health. After his marriage to Miss Ethel Sears Gilman in 1919, he made his home in Newton. Beside his widow, he leaves a sister, Mrs. Josiah E. Bacon, and a brother, Charles E. Braman, both of West Newton.

Francis W. Hight, known best to the architectural members of the Class, died at his home in Winchester, Mass., November 21, in his 62nd year. For several years after leaving the Institute, Hight was engaged in designing. In 1900 he became art manager of the *Youth's Companion* and later general manager of that magazine. He superintended the removal of its plant from the old location on Columbus Avenue to the new building, which he designed, on Commonwealth Avenue in Allston. Some years ago he left this association and entered the advertising and publicity business, in which he was actively engaged until 1931. He is survived by his widow, who was Louise M. Small of Portland, and two sons, Robert E., of Augusta, Maine, and Philip S., of Winchester; and a brother, C. A. Hight, of Brookline, Mass.

George Earnest Merrill of Montclair, N. J., nationally known architect and Secretary of the Department of Building Counsel of the American Baptist Home Mission Society, died on November 22 at the Geisinger Memorial Hospital, Danville, Pa., where he had lingered after an operation for appendicitis performed a month before. At the time of his sudden illness, he was returning from Michigan by automobile with Mrs. Merrill, after attending the centenary celebration of Kalamazoo College.

After leaving the Institute, Merrill was located in Boston until 1895, when he became manager of construction work for Ernest Flass, architect of New York City on various projects, notably the rebuilding of the United States Naval Academy at Annapolis. In 1902 he joined the Noel Construction Company and was made superintendent of construction in charge of this rebuilding work. Later he became Vice-President of that company and removed to Chicago in 1908, to take charge there of the building of the United States Naval Training Station. Through this company and other business connections he continued in general construction activity until 1920, when he became head of the newly created Bureau of Architecture of the American Baptist Home Mission Society. During the succeeding 13 years he rendered the churches, not only within the territory of the Northern Baptist Convention, but in many other communions, a type of architectural service of high order. His handling of church edifice projects has brought him wide recognition. There have been built under his

guidance over 600 church structures at a total cost of \$16,000,000. He acted as consultant on 1,100 other church building projects. Merrill has made his home in Montclair for many years and from time to time attended '93 class gatherings in New York. As one of our New York members writes, "Although I never saw Merrill but two or three times when he came to our class affairs, I felt a strong attachment to him. He was a lovely and interesting personality and lived a very worthwhile life." — FREDERIC H. FAY, Secretary, 44 School Street, Boston, Mass. GEORGE B. GLIDDEN, Assistant Secretary, 551 Tremont Street, Boston, Mass.

1895

Several of the '95 boys advise they have turned over a new leaf for the year 1934. Won't it be interesting to hear later how these various resolutions are operating! This surely will be good reading if promises are fulfilled.

Al Zaph writes from Orange, Calif., that his section of the country provides complete comfort throughout the year for men of our advanced years, and extends a pressing invitation to all to live in California, where living is inexpensive and eternal sunshine is at hand.

The New York section of the Class held a luncheon on December 20, in honor of Walter J. Rickey, Managing Director of the Singer Manufacturing Company, Ltd., Singer Clydebank, Scotland. The following members attended: Azel Ames, Arthur L. Canfield, Fred B. Cutter, John H. Gardiner, George Nichols, Frank C. Schmitz, Gerard Swope, and Thomas H. Wiggin. The luncheon, arranged by Orville B. Denison '11, who is one of the executives of the St. Moritz Hotel, 50 Central Park South, was held in the Rose Room on the 31st floor, and Mr. Denison also attended.

Everyone was glad to see Rickey as he had not been on this side of the water for some time. Your Secretary instructed Fred Cutter to put him through the third degree with the following results: Walter has apparently six children, five daughters and one son. Mr. and Mrs. Rickey were in this country to attend the wedding of one of their daughters, who was married to Percy Mylcreest Phelps, in Schenectady, on December 2. Rickey's son married an American girl last March and is now in Paris. This son has taught at the Groton School for boys during the past three years. Four daughters are still living with him in Scotland. Mr. and Mrs. Rickey arrived in the States on the U. S. Lines *Manhattan*, November 13, and returned to Scotland on the *President Harding*, on December 27. Rickey has been appointed Honorary Secretary of the M. I. T. for Scotland. He informs us that business has improved in Scotland during the past year and they are looking forward to further improvement during 1934.

Johny Moore could not attend the luncheon as he is very busy as Technical Adviser in the Department of Labor, of which Senator Wagner is the head. Due to a bad accident injuring his knee, Eddy Huxley missed the event.

1895 Continued

Al Sloan, Jr., had to forward regrets as he was on duty in Washington from December 19 to 22. Regrets were also received from Coddington, Park (who is now in Europe), Wolfe, and Sheridan of New York City; Booth and Frank Locke of Boston; Alden of Hartford; Faxon of Poughkeepsie; George Moore of Yonkers; Gerard Matthes of Vicksburg, Miss.; Swift of Washington; Tillinghast of Providence; Wheeler of Cocoa, Fla.; and Yoder of Ayer, Mass. Remember, we are planning for the great reunion of 1935, and the Class of '95 promises all a good time. — LUTHER K. YODER, *Secretary*, 69 Pleasant Street, Ayer, Mass. JOHN H. GARDINER, *Assistant Secretary*, Graybar Electric Company, 420 Lexington Avenue, New York, N. Y.

1896

We are planning a big turnout of '96 men at the Annual Alumni Dinner in Walker Memorial on Saturday, February 17. Come if you possibly can.

These notes being written just at Christmas time, the Secretary has received cards from various members of the class, including one from Welles Mortimer Partridge. It was a post card cut entitled "Father Partridge and his little dog Spot." It showed Partridge in his long clerical garb, carrying a cane in his right hand, and holding the dog on a leash in his left hand. He has acquired a growth of whiskers in San Diego and has quite a patriarchal appearance. — Charlie Hyde, in sending his greetings from California, stated that he had bought a penny bank and had already accumulated several pennies therein toward financing his trip East to our 40th anniversary in 1936.

Through Dr. Dewey of the Economics Department of Technology we have rediscovered L. L. Lamborn, who has been lost for a considerable period. Dr. Dewey attended a meeting in Mexico City in November, and as a result of the publicity on this meeting Lamborn called upon him, and reported that he had his business headquarters at 10 Plaza de la Republica in Mexico City, and had his home at 2 Calle Humboldt in Cuernavaca.

A man who has recently become lost to us is Captain Thomas W. Bailey, who was for many years a civil engineer in Kingston, R. I., and more recently has been in Claremore, Okla. We have tried to locate him through the Police Departments, but the chiefs report that he is unknown to them, thus indicating that he has apparently kept straight. If anyone can supply a clue to the present whereabouts of Bailey, it will be most welcome. — A report from the Secretary of the Chicago Club is that Ralph Whiting is understood to have died sometime during the past year. We are trying to get further details.

During the latter part of November the Secretary ran across Jim Smyser, who was searching for information in the Technology libraries. He had no particular news to report, except that he and Mrs. Smyser had been having a strenuous time

in Washington earlier in the fall cleaning out the mansion of an old relative who had died. This mansion was found to be a veritable storehouse of antiques and treasures. — Charlie Lynch is a fellow who has the habit of disappearing periodically. However, a little sleuthing has disclosed his present address at 7 Hudson Avenue, Haverstraw, N. Y.

Frank Guptill, who runs the Sears Street Garage in Boston, and lives in the town of Harvard, reports that he had some particularly nice apples on his place this fall, and that any time any of the '96 men care to drive to Harvard, they will be given a warm welcome, and will be presented with a box of these fancy apples "free gratis for nothing."

We left the Fullers southbound from Rio de Janeiro. We now go on: "Two days at sea from Rio de Janeiro brought us to Montevideo, Uruguay, with a drop from tropical heat to a temperature of about 75°. A low hill, the only elevation in the vicinity, gives its name 'I See a Mount' to the city. An American touch is given by the great Swift meat-packing plant at the base. The city itself is modern and up-to-date with a population of 300,000, broad boulevards, handsome plazas, fine buildings, a botanical garden, and bathing suburbs which attract visitors from as far as Brazil and the Argentine.

"Some of us, as purchasers of the bonds by which they were financed, felt a kind of proprietary interest in the modern docks and warehouses begun on a large scale but now standing half finished, with interest defaulted and the city bankrupt. A nearly complete absence of traffic police is perhaps another result of the financial stringency. Here, as elsewhere throughout South America, automobiles are almost entirely of American make.

"Buenos Aires, Argentine, was an overnight trip by steamer across the muddy Rio de la Plata, or River Plate, here 50 miles broad with shores invisible from the middle. The name, meaning silver, came from trinkets acquired from the natives by the same Sebastian Cabot who a few years earlier, in 1498, had been the first after the Norsemen to visit our own New England coast.

"The city, known as the 'Paris of the Western Hemisphere,' has a population of nearly 2,000,000 people and is the center of Argentine wealth, founded largely on the cattle industry of the interior. Although on a flat plain, only a few feet above the level of the river and without scenic interest, it is nevertheless a magnificent city, with plazas and buildings rivaling those of the finest European cities. Of the business structures, that known as the Boston bank, a branch of the First National, is among the finest. We had dinner on the roof garden, overlooking the city from a height of 12 stories, of a hotel which would rank among the best in New York or Boston. Horse racing arouses intense interest, and the Jockey Club is the wealthiest and finest in the world. In our tour of the parks, brilliant red, yellow, and green pigeons,

presumably dyed, as well as ordinary varieties, followed by thousands an attendant who led them from place to place with a whistle.

At the time that the Secretary is writing these notes, the Fullers are on another trip, having left early in December for South America, where they land at Cartagena, ascend the Magdalena River 600 miles, cross the Andes by automobile to Bogota, and return to Buenaventura, and back home by way of Panama. — CHARLES E. LOCKE, *Secretary*, Room 8-109, M. I. T., Cambridge, Mass. JOHN A. ROCKWELL, *Assistant Secretary*, 24 Garden Street, Cambridge, Mass.

1900

Captain C. D. Thurber of the Corps of Civil Engineers of the Navy was detached from duty as Public Works Officer of the Navy Yard, New York, on December 1, and granted two months' leave of absence preliminary to his being placed upon the retired list, on the first of next February, as a result of his voluntary application after 30 years' service as an officer in the Navy. It will be recalled that two members of our Class were commissioned in the Civil Engineers Corps of the Navy at the same time, taking their examinations together, Cooke and Thurber. Cooke is now on duty as Public Works Officer of the Navy's largest western outpost, the Navy Yard at Pearl Harbor, Hawaii. For those not familiar with the Navy's organization, it should be noted that the Civil Engineer Corps has charge of the design, construction, and repair of the Navy's large and varied establishment on shore, together with the administration of the funds appropriated therefor. The work is administered through the Bureau of Yards and Docks of the Navy Department in Washington, of which the head is a commissioned officer of the Corps, with the rank of Rear Admiral. The present Chief of the Bureau is Rear Admiral A. L. Parsons of the Class of 1897. Indicative of the growth in importance and extent of the Navy's Public Works is the fact that the Corps has grown in Thurber's time from an authorized strength of 40 commissioned officers when he entered in January, 1904, to 110 officers today. Thurber has been promoted through the various grades from Lieutenant to Captain, receiving his present rank in 1927. For the higher ranks of Rear Admiral, Captain, and Commander, promotion is by selection and not by seniority.

Although the work of the Corps is spread over the east and west coast, the Canal Zone, Cuba, Porto Rico, the Island possessions of the Philippines, Guam, Samoa, and Hawaii, Thurber has been fortunate in having had duty outside of the Continental limits of the United States only once, and that for a period of three years at Pearl Harbor, Hawaii, from 1919 to 1922.

He has also been fortunate in his relatively long tours of duty, having had in his 30 years only nine regular assignments, averaging somewhat more than three years each. His details cover the

1900 Continued

Navy Yards at Norfolk, Va.; Brooklyn, N. Y.; Pearl Harbor, Hawaii; Boston, Mass.; and Portsmouth, N. H.; the construction of the Naval Training Station at Great Lakes, Ill., near Chicago; and nearly five years of duty at the Bureau in Washington during and just preceding the World War. During this period, he was in charge of the Bureau's Design Division, and rendered a service which the Navy Department considered especially meritorious and for which he received the Department's special letter of commendation. The Class may well feel proud of this fine record. — C. BURTON COTTING, *Secretary*, 111 Devonshire Street, Boston, Mass.

1901

Well fellows, here's a Happy New Year to you. This is, of course, the traditional method of greeting and I am glad to get it started before January 2 brings you the form on which you register that pleasing blend of fact and fiction colloquially termed an income tax return. And then on the basis of this statement the government will proceed to take all of the food out of the mouths of yourself and all your children that you may contribute genially to your own complete destruction. If I were writing this after January 1, I shouldn't have the heart to talk about happiness in the New Year. Even the dissipation which has followed the dispersion of the dark cloud that has hovered over us for 14 long and officially arid years will not be adequate, I fear, to lighten the burden of taxation. So let us turn to pleasanter things: the thought of a Christmas of long ago when the table groaned with good cheer and those about it groaned later from an adaptation of the same cause, when the Yule log was dragged to the fireplace amidst a chorus of Christmas carols sung vociferously and slightly off the key, when a beaker of mulled claret was gripped in every hand and its warm and genial content slowly percolated to the outermost fastnesses of the corporeal embodiment of the reveller.

And speaking of mulled claret, let me give you my recipe for mulled cider, a beverage that will warm the cockles of your heart and which may now be mentioned without fear of the restrictions laid upon us by the noble experiment. Take a gallon of cider, sweet, and place in a porcelain saucepan of ample proportions, raise its temperature to the point where the insertion of the tip of the finger produces hasty withdrawal emphasized by a gentle curse. In the meantime, while the B. T. U's are being collected, take six eggs, an added complement of granulated sugar, and a modicum of powdered clove, cinnamon, and nutmeg, break the eggs and mix the whole into what in my childhood was known as a yellow "pudden" dish. Decant the hot cider slowly onto the mixture, stirring rapidly so that the entire mixture is homogenized and the egg molecules become a dispersed phase and not a flocculated colloid. To the mixture add one quart of applejack which has been

warmed tenderly so that its alcoholic content remains unabated, and integrate it again by slow pouring and stirring with the cider. Then transfer to the family punch bowl, call in the friends, serve them the mixture in tall glasses of ample proportions and enjoy at the last a beverage which has gladdened the hearts of countless generations. It's meat and drink, my lads, and a sound potion as midnight draws on.

The above may be gratuitous, but I am empowered to issue this statement by the NRA — the blue eagle is moulting and decency forbids its public appearance as any ornithologist will explain to you — the Council of Social Agencies, and the Communion of Good Fellows.

Speaking of whom, Al Sulzer writes me that he has been busy working on codes. He also adds bitterly, "They say that the country is happy that has no history" but apparently thinks better of his first thought and fails to carry his introduction to its logical conclusion.

Matt Cushing of Saratoga, Wyo., is still raising cattle and he and our other rancher, Phil Moore, are preparing a code for the cattle industry. In that connection and by a tangential approach which I trust may be appreciated, a friend of mine some years ago sold a large cattle ranch in Arizona to a widow lady who desired it for her son, a stripling whom she felt might be better employed than in sociological studies of New York's less known speakeasies. As the only contact that the boy had had with beef cattle was a filet mignon, it seemed wise to employ a foreman who had a rather more intimate knowledge of the raw material from which the filet mignon comes, so a competent cow-man was employed and his contract sent on to the purchaser for her signature and approval. Following what I believe is the usual practice, he (the foreman) was guaranteed a modest salary and a bonus which depended upon the increment or, as I believe it is technically called, the "get" of the herd. The latter term was unfamiliar to the lady in question and she wrote to the agent asking information as to what this mysterious "get" depended on. After due deliberation the agent wired her "on the sex appeal of the cows," signed his name, and let nature take its course.

Austin Hyde writes from Damascus, Va. — a pleasing oriental touch that and one that I know will bring a craving for travel to Fred Clapp, should this chance to meet his eye. Austin is manager of the Beaver Works — named, I presume, after the well-known Institute of Technology, or possibly no more than a tribute to Austin's equally well-known industry. The Calco Chemical Company is the participating corporation. Incidentally, I can conceive of occasions when that pleasing alliteration might present lingual difficulties, particularly in these enlightened days of repeal. Anyhow, Austin sends his greetings but refuses to commit himself further.

Ned Church writes that he is never able to attend a Class reunion for the Stevens Polytech., of which he is one of

the supporting pillars, always holds its Commencement at that time. With my strong interest in educational matters I am approaching the President to change the Commencement date. It will be good for Ned, not bad for Stevens, and pleasant for all of us. As a naval architect, he will, I assume, sail down to the Cape in his stick and string bateau, while Al Arnold in his fabled yacht will complete the flotilla. We're going to have that reunion, you know, and I hope this year. I feel that one should not postpone a 32nd Reunion too many times for there are but few of us in the fortunate position of that classmate of military fame who, if recollection serve aright, can celebrate four 32nd anniversaries in a row and still have a reserve of one-as an insurance.

Well, gentlemen, as I said initially, I greet you in the New Year and you will read these lines, or may, well after the dawn of 1934. I applaud your courage that you are still prepared to go on with the New Deal — from the same old deck, however, be it noted. May we meet in 1934 and subsequently empty one glass, of whatever taste and fancy may dictate, to the past, the present, and the future of that primest jewel in Technology's crown, the Class of 1901. Skoal! — ALLAN WINTER ROWE, *Secretary*, 4 Newbury Street, Boston, Mass.

1902

Clarence Douglass Starr died at his home in West Barrington, R. I., on December 8. He had suffered from heart trouble for the past year and for the last three months had been unable to keep on with his business duties. The funeral was held at St. John's Episcopal Church on Sunday, December 10. Three of his classmates were among the bearers at the service: Stephen A. Gardner, who was a boyhood friend, and George Seabury and Grant Taylor, who were his room mates while at M. I. T. Burial was at Cedar Grove Cemetery in Ashmont, Mass.

Starr was born in New London, Conn., and came from the schools of his native city to Technology, pursuing the Course in Mechanical Engineering. After graduation, he spent one year as an assistant in that department and then was for a year with the Louisiana Purchase Exposition at St. Louis. After the Fair was over, he became connected with the Barstow Stove Company of Providence, with which he remained till his death. In due time he became the factory manager of the company and as the business gradually shifted from coal to gas ranges and the problem of enameling became important, the Rehoboth Porcelain Enamel Company was formed with a plant at Rehoboth, Mass. Starr was Treasurer and General Manager of this concern and became an expert in the enameling field. A few years ago the Barstow Company effected a partial merger with the Leonard and Baker Stove Company of Taunton, Mass., and the heavy metal work was done at the plant of the latter concern, Starr giving his personal attention mainly to the Rehoboth plant.

1902 Continued

Starr was active in the affairs of his town, Barrington, where he was a trustee of the public library and Secretary of the Zoning Board of Review. He was a vestryman of St. John's Church, a member of the Providence Engineering Association, and the American Ceramic Society. In 1905 Starr married Miss Alice G. Sherman, of Dorchester, Mass., a cousin of his classmate, Grant Taylor. Mrs. Starr survives him, together with a son, Douglass Sherman Starr, a lad of 15. Starr is also survived by his aged mother and one brother, Professor Charles J. Starr of the University of Illinois.

Thirty odd years have wrought great changes in many of our classmates, but the Clarence Starr whom we knew in our student years was the same man throughout. Modest and self-effacing, he did his work quietly but thoroughly. He had the respect of everyone who knew him and the deep affection of those who knew him well. — FREDERICK H. HUNTER, *Secretary*, Box 11, West Roxbury, Mass. BURTON G. PHILBRICK, *Assistant Secretary*, 246 Stuart Street, Boston, Mass.

1903

The Secretaries have received a memorandum from Professor Locke concerning Gaenslen, III, which is interesting enough to quote in full: "George R. Gaenslen '03 is now located at 323 St. Anthony Avenue, San Antonio, Texas, which is his old home town, to which he has clung, except for certain periods, during the 30 years since his graduation. He has followed the mining profession more or less. Prior to the War he was at Jerome, Ariz., as one of the two field engineers doing topographical work on the mountain above the mine, for the purpose of laying a railroad track, and ultimately mining the mountain itself. The surveying was over that part of the mountain which had been on fire for years and the wind and dust were rather trying. When the War came he entered the Army and was commissioned Captain at San Francisco and given orders to report at Vancouver Barracks, Wash. There he was put in the Spruce Production Division, and on Christmas, 1917, was ordered to take command of the 114th Squadron and go into the woods, where he remained until January, 1919. Fortunately, it was a delightful situation in the Coos Bay district, south of Marshfield, Ore., lying about 36 miles from Fort Orford on the Pacific Coast. The climate was tempered by the Japan current, and was accordingly mild, so that never did he have occasion to put on an overcoat during all the time he was there. The camp location was at Powers, at the end of the railroad, and on the border of one of the wildest regions in the country. He failed to get back into mining after the War, and consequently when an opening came in the Engineering Department of the City of San Antonio, he took it. Depression in the Southwest has meant that in his case city engineering work was curtailed, and he has not been doing anything for a while. He married some years ago, and now has two children, a

girl and a boy, and he remarks facetiously that Mars must have been in the constellation when they were born, for they are always fighting."

A personal note from H. F. Bell, I, shows him to be a resident partner of Lybrand, Ross Bros. and Montgomery, Accountants and Auditors, New York City, with whom he has been, in one capacity or another, for over 20 years. He expressed sorrow at not being able to be present at the Thirtieth Reunion.

By the time this is read, the winter will be half over, but just at present (December 22, 1933) the Secretaries feel like wishing every member a Prosperous and Happy New Year. Here's hoping it is, as you read this, shaping up well for such a most desirable condition.

Also we hope you who read this will not forget that if you are to read class news every other month, you must help us out to the extent of sending in bits of news either of yourself or others. A word to the wise should be sufficient. — FREDERIC A. EUSTIS, *Secretary*, 131 State St., Boston, Mass. JAMES A. CUSHMAN, *Assistant Secretary*, 89 Broad Street, Boston, Mass.

1905

John Damon, VI, 221 Clifford Court, Madison, Wis., wrote in November: "Professor E. D. Ayres, B.A., VI-A S.B.'22, VI-A S.M.'23 (Jackson and Moreland, Boston), got me out of the depression into a very interesting and busy job here. The work was to help him establish a continuous inventory system for public utilities so they would get a square deal on rates without going to court for it. Professor Ayres is developing a wonderfully fine plan of working this out with the utilities and I believe the world will hear of this work and of him in years to come.

"The Commission demanded a reorganization of their Engineering Department to carry out the work and rather unexpectedly I became, recently, the chief engineer of the Public Service Commission of Wisconsin. As this Commission has control of electric, telephone, gas, and water utilities, toll bridges, streams, and lake levels, and, under some conditions, sewers, there is no occasion for the Engineering Department to go to seed. The days aren't long enough and the nights are too short for all the things I'd like to do, so don't expect much correspondence from me.

"Mrs. Damon and Merrill and I all like Madison and are well and enjoying the zest of busy life here."

A formal invitation was received for the official opening of the Croft Brewing Company, Roxbury Crossing, on December 4. Unable to go and sample the new product (we'll bet Sid Strickland, IV, and Andy Fisher, X, were there), your Secretary sent Ed Burkhardt, XIII, Secretary-Treasurer, the following wire: "Ought Five remembering your beer wishes you success in new venture."

From Harry Wentworth, VIII: "I have been doing some trustee and executor work on estates large enough to have

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the normal problems of these times; attend regularly the executive meetings at the two banks on whose directorates I serve; faithfully at the Warren Brothers meetings, and those of three or four industrial companies where they let my jabber go in one ear and out the other. Was fired from the Massachusetts Golf Association after three years as Secretary-Treasurer; they gave me the ultimatum to take the Presidency or get out. The New England Association took pity on me and made me first Vice-President.

"A good deal of time (and thought) has been devoted of late to my boys: three, one graduated from Dartmouth in '31, Phi Beta and *Magna cum Laude* (also football and hockey player); second, there now (on the Glee Club); and third, hoping to go. Dartmouth is all right, but I am naturally disappointed that I haven't been able to develop a technically interested boy for Tech."

Came a copy of *Patchwork* (reg. U. S. Pat. Off.), house organ of The E. L. Patch Company, Boston and Stoneham. On page 2, a group picture of Ralph Patch, XI, President, Treasurer, and General Manager, sitting around the directors' table. We hadn't realized there was so much of Ralph. Although he has aligned himself with another class, we had him first and, at his request, his card remains in our catalog.

Dan Harrington, X, reports recent visits to Wilmington of President Compton and Dr. Tryon and adds: "I believe I am the only '05 man in Wilmington although there are many Tech men of other years here. I have been acting as Honorary Secretary for Delaware at Dr. Compton's request for some time, and through this means have been able to keep in closer touch with Tech affairs than I used to. We will probably organize a Wilmington Tech Club sometime in the future when the country has tired of swinging to the left and it realizes that confidence counts in the increase of employment and prosperity."

Ros Davis, XIII, who, besides providing copy for the Class Notes, is assistant Treasurer of Wesleyan University, attended a convention of college business officers in Rochester, N. Y., in December. He writes: "There were several hours between adjournment and train time and I chased over to the Eastman plant to hear W. K. Lewis, X, give a lecture to kodak kemists. I had already heard he was conducting an extension course there to keep the scientists up to the minute.

"I had gotten into a shadowy corner by the door when Doc breezed in and started shooting. It was a little difficult to follow but I got this. The chemistry that Bardwell gave us in 1901-02 was the bunk. Didn't he say that the atom was the smallest thing in the world, classmates? Certainly did. It is nothing of the sort. The atom is a regular universe composed of neutrons, deuterons, and positrons, behaving like no other mechanism we ever heard of.

"The neutron is the neutrally charged particle of matter and is the material that separates the nucleus of the atom

1905 Continued

from the highly electrified outside orbit which is charged negatively in every case by positrons. The deutons are neither matter nor energy but are merely waves induced in the atom by the quantum mechanics of the system. These waves interweave between the outside orbit and the interior and this brings about a series of electrifications which counteract each other in the manner shown by Arrhenius's theory and the third law of thermodynamics.

"Do I make myself clear? It is a little difficult to describe though intensely interesting. I suggest that you have Doc elaborate upon it at the next class party."

Charlie Johnston, III, came through, early in December, with: "Last week in Chicago, I could not get to see George Jones for I did not have the time, but I finally located him late one evening at a card party at the home of one of his friends; we chatted for a few minutes and he gave me what I deserved for not making time to see him. Last summer in Boston I ran in to see Ed Barrier in his office, enjoyed the time he took from other work to talk with me, and I had to, with keen regret, for lack of time turn down an invitation to go out to his home for dinner with him and his wife.

"I am still manager of the Virginia Smelting Company, and we have added methyl chloride to the products we are handling, purifying it at West Norfolk and shipping it to a number of those to whom we have long had the pleasure of shipping our 'Extra Dry Esotoo.' We are also making some progress in the sale of our 'Fine 89% Zinc Sulfate.' A new use for zinc sulfate that is intensely interesting is in agriculture. We have sold zinc sulfate for several years to be used as a spray on peach trees, for the control of bacteriosis. One of my trips this year was to see the results of this work in Georgia on pecan trees and in Florida on the tung oil tree. [What is a tung oil tree? Sec.] The zinc sulfate had been applied to the soil around pecan trees suffering from a disease known as 'little leaf' or rosette, and on the soil around tung oil trees that were suffering from a disease known as 'bronzing.' Both of these diseases resulted in poor growth if not in the death of the trees. The effect of the zinc sulfate was materially to improve the leaf growth.

"On another trip this summer, my wife, and daughter, Margorie [sic] joined me at Buffalo and we went to Chicago and 'did' the Fair. Our liquid sulfur dioxide was used in the Science Building for the making of sulfuric acid. Probably most if not all those who saw this exhibit thought that the gas formed by the burning of the sulfur was used for the making of the acid. Not so, it would have required quite a different and more elaborate installation to have used it. The gas formed by burning the sulfur was wasted and behind the scenes sat cylinders of liquid sulfur dioxide and they furnished the SO₂ from which the sulfuric acid was made. [Rotten fake. Sec.] We enjoyed the Exposition, though it was

a very creditable affair, and worth going a long distance to see, and we enjoyed the exhibit of our own M. I. T.

"As to activities outside of my work, I am still glad to be a Rotarian. I still appreciate the honor of being an Honorary Secretary of M. I. T., Second Vice-President of Norfolk Association of Commerce, Director of Virginia Manufacturers Association, and am connected with the local Y. M. C. A., Hampton Roads Chemists' Club, and Hampton Roads Engineers' Club, but confidentially, I am not much good to any of them and why they don't replace me with some younger and more worthwhile fellow is beyond my understanding." — ROSWELL DAVIS, *Secretary*, Wes Station, Middletown, Conn. SIDNEY T. STRICKLAND, *Assistant Secretary*, 20 Newbury Street, Boston, Mass.

1907

Having received a change of address notice from the alumni office for Warren I. Keeler, the Secretary wrote him a letter suggesting that it would be pleasant to learn of his activities, both business and personal, with the result that on December 20, we received a very welcome letter. From it we learn that from March, 1912, to March, 1928, Warren was varnish chemist with Valentine and Company. Then he became Treasurer and sales manager of Keeler and Long, Inc., paint and varnish manufacturers, of Waterbury, Conn., until in September, 1933, he moved to New London, Conn., where he is Secretary-Treasurer of Keeler's Paint Works at 81 Golden Street, retail and wholesale paint dealers, distributors, and manufacturers. In 1909 Warren married Miss Jane J. Johnson of Malden, Mass., who died in 1926, and in 1927, he married Miss Dorothy H. Doig of Scotland and New York City. He has two sons, Nelson H., 19 years old, and five-year-old Warren C. He extends his greetings to all '07 men and will welcome any members of the class who should call in to see him in New London.

Howard J. C. MacDonald's address in November, 1933, was Palais Alexandre III, Boulevard Alexandre III, Cannes, France. It may be different when you are reading this, as his changes of location have been rather frequent during the last few years. We do not know what his professional connection is.

When at the Institute on business one day last December, from the desk in the office of a professor we picked a book entitled "Theory of Thermionic Vacuum Tubes," and discovered that the author is E. Leon Chaffee — our '07 Chaffee — who is a distinguished professor of physics at Harvard University. — On another day last December, when walking through the main lobby of the Institute, we noticed a group of students gathered around a large framed exhibit containing many photographs of Tech Show, 1906. It had been a long time since we had seen these reminders of "older days," so we joined the group, and could not refrain from saying to the boys that one in an upper corner, along with other

chorus men wearing football suits, was the Secretary himself. Of course, the undergraduates were thrilled (!) that an old-timer should thus be with them in the flesh, and we pointed out to them Alexander Macomber, our honored Class President, Corporation member, and perennial chief marshal at Commencement time. There also was Ray Parlin, long since passed away; also Dexter Boles — Major Boles of freshman days, now entirely lost as far as the Secretary is concerned. And Bert Bancroft was there. What a petite, dainty, and alluring "girl" he was in that show! And could he dance and make goo-goo eyes! Little would the many employes in his shoe factory (now located at 44 Moody Street, Waltham, Mass., by the way, instead of in South Boston) suspect that the head of the firm was ever so frivolous and gay. We also detected in the ballet Anthony Arnold, now Vice-President of the American Agricultural Chemical Company. As we talked with the boys, we found that one of them, by the name of Hudson, is business manager of this year's Tech Show and is doing his best to revive interest in this undergraduate activity, which has been seeing troublous times during recent years. When we told him that '07 was our class, he at once exclaimed that he knew intimately Robert L. Moody, a senior and a son of our classmate, Harry L. Moody, and that he had been at Harry's home at 114 Atlantic Avenue, Marblehead, Mass. A small world, this!

We wrote to Harry and received a reply which reads, in part, as follows: "There is not much to say about myself at present. As you know, my business life has been spent in equipment and construction fields, and as those lines are about the dearest of all the dead ones this depression has created, I have not been active in them for the past year and a half. Pending the return of a semblance of activity in those fields, therefore, I am devoting my time to a company connected with the dairy industry in which I am part owner and Vice-President.

"I see Oscar Starkweather occasionally, and have spent some very memorable occasions on his boat. We have, at various times, mixed up many a strange concoction, but we have discovered one thing very definitely, and that is: that gin and tomato juice do *not* make a good cocktail." — BRYANT NICHOLS, *Secretary*, 12 Newland Street, Auburndale, Mass. HAROLD S. WONSON, *Assistant Secretary*, Commonwealth Shoe and Leather Company, Whitman, Mass.

1909

1909-1934. Making plans for the 25th Reunion?

On December 9 at the Technology Club, the New York representatives of 1909 held their fall class luncheon with ten men present. These New York fall and spring luncheons have become regular get-togethers, with the attendance usually from 10 to 14. They are a fine means of keeping in touch with the class and many very enjoyable friendships

1909 Continued

have developed out of them. Paul Wiswall says he has a mailing list of over 50 and wishes he knew a way to bring out a few of the men who are always sports enough to return their cards, but who invariably do not come to the luncheons.

Maybe some of you who have tuned in on WNAC lately have heard Laurence Winchester talk on "Stock Market Barometers that Point Upward." Laurence is the President and Treasurer of the Winchester Institute of Finance, a group of investment counselors.

The Secretary regrets to announce the death on November 26 of Mrs. Elizabeth Babcock Willman, a graduate of the Class of 1909 in the Department of Chemistry. In her will there was a bequest to the Institute for women chemistry students.

George Wallis writes: "Our daughter, Elizabeth, is now in the junior year at Smith College, Northampton, Mass., and our other daughter, Frances, has just started her freshman year at Connecticut College, New London, Conn. It is hard to realize that the girls have grown up and are of college age and this, together with the thoughts of our twenty-fifth Reunion, makes me realize that we have covered a lot of ground since graduation." — CHARLES R. MAIN, *Secretary*, 201 Devonshire Street, Boston, Mass., PAUL M. WISWALL, *Assistant Secretary*, General Foods Corporation, 250 Park Avenue, New York, N. Y., MAURICE R. SCHARFF, *Assistant Secretary*, Main and Company, 1 Wall Street, New York, N. Y.

1910

We have received three letters this time for the notes. The first is from Charles Robinson: "As you have taken the trouble to write to me, the least I can do is to give you a reply, and say thanks for your interest. As I have not been active in class affairs, probably only a few will remember me. For the past several years I have been running a small radio service business right from and in my home. It might interest you to know that my preparation for this line of work was obtained during 1923-24-25, from three courses of evening lectures at M. I. T. which were conducted by the State Department of Education. It seemed like old times to be again sitting in a Tech lecture hall, even though it was a new Tech to me. Like most other businesses, this has felt the effects of the recent depression, but we are looking toward better times. Would be pleased to have you drop in and say hello any time."

Carl Lovejoy writes: "Just came across this. I did not answer it at the time as I thought I might see you in Boston the middle of May when I was there. Did not find the opportunity to do so, but I am ashamed to say that I spent a month with my mother in Quincy in the middle of the summer and never at least 'phoned you. The fact that I took a month's vacation in what should be a busy time of year explains how busy I was. I visited M. I. T. with my boy, who has

hopes of entering there in another year and a half, and is shaping his studies now toward that point."

Howard Richardson writes: "I was very much pleased to hear from you and glad of the opportunity of letting my fellow classmates know that I am still on the map. On leaving Technology in 1910, I secured a position in the U. S. Department of Agriculture and am still at it, doing research work in cotton fibers after some experience in running spinning tests at Fall River, New Bedford, Raleigh (N.C.), and Clemson College (S. C.). During the War, I was stationed at New Bedford, Mass., working on airplane fabrics. Did not get in the War, as during 1910 I suffered a stroke of infantile paralysis which left me slightly lame, but still able to carry on. I weigh 180 pounds now and I am afraid some of my friends would not know me if they saw me on the street."

"I was married in June, 1924, to Miss Anna Bicknell of Columbia University, and we have two children, a boy (about eight-and-a-half years) and a girl (seven years old). They are getting along nicely in school, far better than their father. Hope the boy will want to go to Technology when he grows up. My brother, Charles D. Richardson, '06 and my brother, Arthur B. Richardson, '11 both passed away a number of years ago. — With best regards to all the 'boys.'" — DUDLEY CLAPP, *Secretary*, 40 Water Street, East Cambridge, Mass.

1911

What a wonderful pre-Christmas present Carl Richmond, I, and his wife had, with the arrival on December 5 of John Quincy Richmond! "Now we are four," blithely carol the Richmonds. Classmates, I know, join me in congratulations!

Bob Morse, VI, surprised his wife on her birthday, December 11, with a dinner party here at the St. Moritz, followed by a theater party. There were five in Bob's party. — The following day I ran into Bart Nealey, I, on the street. He is still with the American Gas Association and his publicity work takes him out of town a lot.

Two other classmates, who were unable to attend the dinner here in late November, center their activities in New York. Luis deFlores, II, is a most successful consulting engineer with an office at 19 Rector Street. He is married and has a boy in the freshman class at Tech. Monk has specialized considerably in oil-cracking methods and has developed some original patented methods which are being used by big oil producers to his distinct advantage. — Frank Russell, II, is in real estate, being connected with Brown, Wheelock, Harris and Company, 14 East 47th Street. He also is married.

Lloyd Cooley, X, was on from Chicago for the Chemical Industries Exposition in early December and Emmons Whitcomb, X, was here from Boston on a short business trip at the same time, so the three of us had an enjoyable dinner party one evening. Lloyd is still with Swenson Evaporator Company and is married.

George Forristall, II, wrote me a most friendly letter wishing me success in my new work and adding "if and when the family makes a trip to New York, they will surely write to Dennie for hotel reservations." I hope that opinion is shared by all '11 men. George, you know, is general manager of *Houston Shopping News*, Houston, Texas, and says: "*Houston Shopping News*, which was organized here 14 months ago, is now more than a husky youngster. It is fully established and distributed by us to more than 56,000 Houston homes every Sunday morning and is without question the strongest advertising medium in the city for direct results." George has a fine family and he and Mrs. Forristall always entertained me when I visited Houston as Alumni Secretary, the youngsters keeping me busy at the piano keyboard.

From a recent issue of *The Mining Journal*, via good old Charlie Locke, we learn that Jim Greenan, III, has resigned as general superintendent of the Benguet Consolidated Company at Baguio, P. I., to join the directorate of Marsman and Company, also at Baguio. In his new position he will be associated with J. O. Enberg in the joint management of the mine consultation department. "Greenan," the article says, "started his mining career at the Fairview mine in Nevada and has been on the engineering staffs of the Simon, Olympic, Consolidated Cortez, and Majestic mines, all in Nevada. He has been in the Philippines with Benguet Consolidated since 1930 and during his administration the capacity of the mill increased from 300 to 500 tons a day."

From the Alumni Office we learn that Dippy Allen, II, is still in the Capitol City, with the Washington Gas Light Company. — Bill Davis, I, has been transferred by the Seaboard Air Line Railway from Savannah, Ga., to Norfolk, Va. — Bill Goodhue, I, with the Metropolitan District Commission, Parks Division, has changed his residence from West Somerville to 13 Herrick Street, Winchester, Mass.

In retrospect these notes aren't any too long, or even long enough, are they? You know the answer — how about that New Year's resolution you made to write to Dennie? If you haven't already (and I hope you have), *Do It Now!* — ORVILLE B. DENISON, *Secretary*, St. Moritz Hotel, New York, N. Y. JOHN A. HERLIHY, *Assistant Secretary*, 588 Riverside Avenue, Medford, Mass.

1912

Although Jonathan A. Noyes, II, quite frequently passes through New York and Boston, about the best your Secretaries can do is to get an occasional telephone call or letter from him. On his way to visit his daughter, at Radcliffe, he phoned us recently and wanted to talk about the next reunion. Well, that's the way to have a successful one! Get everybody talking about it three years ahead of time and nothing can stop you when the date arrives. John promises to have his octet there in 1937. With Mrs. Noyes and six grown-up children coming, we can con-

1912 Continued

sider that a good attendance is already underwritten for the Twenty-Five Year Reunion.

John reported that Doc Sloan's wife had been very ill. He promised to visit them and give us the latest news. His letter follows: "I had a nice visit with Doc and Marion Sloan and found to my delight that Marion had been out of the hospital for over a week and was up and around and looking just fine again. She apparently had a hard pull, however. I had a jolly visit with my freshman daughter, Lillian, at Radcliffe. She is enjoying the East very much. I flitted through your town again this week but did not get the opportunity to give you a ring. Hope you and your family will be in the best of health for a Merry Christmas. I leave here today for Knoxville but will be back in Chicago with my gang for the holidays."

Christmas cards are just starting to come in at this writing. One from Mr. and Mrs. Charles E. Dodge, I, says: "I wish we were going to have another reunion this June." — Met Walter Lang, X, in Back Bay Station, and in an interview of about a half-minute duration, he reports "everything O.K."

Your Secretary enjoyed a visit with E. W. Davis, VI, and Bob Wiseman, VI, at the Chemical Show in New York. To put it mildly, both look well-fed and happy. If it goes much further, something will have to be done about it. — FREDERICK J. SHEPARD, JR., *Secretary*, 125 Walnut Street, Watertown, Mass. DAVID J. McGRATH, *Assistant Secretary*, McGraw-Hill Publishing Company, Inc., 330 West 42nd Street, New York, N. Y.

1913

Since the repeal of prohibition Frank H (Jumbo) Mahoney has come into the public press with a bang. A new distilling concern known as the New England Distillers, Inc., has just started a very large spirits distillery in Clinton, Mass., and Mahoney is Vice-President and chief distiller of this concern. We all know that he will be quite happy in this new position since he was connected for many years with the Everett Spring Rum Distilling Company in Everett, a concern where he went immediately upon graduation from the Institute. We would like to congratulate Frank on this new enterprise and wish him luck in this new venture.

While having supper the other evening near the Institute, we very unexpectedly ran into Phil Capen. Phil, as recent class news indicated, has been doing some work up at the State House and, now that the legislature is beginning to get active, will be more busy than ever. He is also getting interested in oil burner engineering, and this evening was on his way to participate in the deliberations of a new group of the Associated Oil Burner Distributors of Metropolitan Boston. Capen still lives in Canton and commutes back and forth.

Our perennial news item, Jim Russell, came into the office the other day looking as dignified as ever. Jim was in search of a new 1934 Boiler Code. He is still doing special tank and boiler work and is ex-

perimenting a good deal with new types of materials in the construction of pressure vessels.

We had a brief but pleasant note from Larry Hart in New York. No particular news was contained in this note; in fact, nothing but a brief comment on a very excellent cartoon clipped from one of the Boston papers. This cartoon had something to do with a brief news item concerning Bronxville, which is Hart's home address.

The officers wish to extend the Season's Greetings and hope that you will have a very Happy and Prosperous New Year, and perhaps at the same time send in a few items of common interest to the Secretary for publication in the news. — ARTHUR L. TOWNSEND, *Secretary*, Room 3-435, M.I.T., Cambridge, Mass.

1914

The gala event of the month was a luncheon held in Boston on December 8 in honor of President Dorrance's visit. Considerable progress was made at the luncheon regarding reunion plans for next June. Some very excellent work is under way, and it now looks as if it would be practical to hold a reunion that would attract a considerable number of the class without a very serious drain on the pocketbook. The eccentricities of our Class were very forcefully brought out at the luncheon by the fact that, although held in the midst of wet surroundings and being held immediately after repeal, it was by popular acclamation a 100% dry luncheon. Those attending were: Ambler, Corney, Crocker, Devine, Dorrance, Fales, Favorite, Gazarian, Hamilton, Morrison, Sherman, Tallman, Trufant, C. H. Wilkins, H. S. Wilkins, and Richmond.

The Patent Office continues to grind out patents for the benefit of 1914 men. No. 1,936,145 has just been issued to E. C. Wentz for a method of sound reproduction by light on film. This is just another one of the many that he has obtained for his very notable accomplishments in the field of acoustics.

Patent No. 1,936,706, also in the field of general acoustics, has been granted to H. A. Affel for a directionally selective sound receiver. It is very interesting to note that, in the brief time that we have been out of Technology, the world at large has made tremendous advances in the whole field of acoustics and several real contributions in this field have been made by members of our own Class.

In addition to his perfect card catalog of various honorary positions held, Porter Adams has added to his list CWA Airport Supervisor for the State of Vermont. We should look forward to plenty and adequate landing fields in Vermont. It will be recalled that Adams has been a pioneer in numerous and adequate landing fields as an essential adjunct to airplane safety.

It has been commented on before in these notes that F. C. Atwood has been doing much constructive work in the general field of paints and acoustic plasters. He has been active in the trade as-

sociations of this field, and we now find him President of the Federation of Paint and Varnish Production Clubs.

Dick Favorite, after many years' experience with Stone and Webster, has gone into private consulting work covering the field of industrial reports, particularly on steam and power plants. It is very pleasing to note that Favorite is one of the engineers who have entered the private consulting field and in these much talked-of days of depression is finding plenty of real work to do. — HAROLD B. RICHMOND, *Secretary*, 30 Swan Road, Winchester, Mass. GEORGE K. PERLEY, *Assistant Secretary*, 21 Vista Way, Port Washington, N. Y.

1915

It's a little late, but I hope you have all had a very happy Christmas holiday and that you have begun the new year with good cheer and every opportunity for success, happiness, and prosperity. Wish me the same by sending me in some material for our column. In other words, write me letters about yourselves and other classmates.

Bit by bit I have collected the following: Alfred H. Schoellkopf of Buffalo has been elected President of the Niagara Hudson Power Corporation and has moved his office to New York. Schoellkopf's family has long been identified with this company. We wish him every success in his new position. — Everybody remembers good old Chet Runnels as being the busy and active Secretary of the Lowell (Mass.) Chamber of Commerce. Chet recently resigned from that civic position to accept a job as head of the real estate department of the City Institution for Savings in Lowell. To have bankers among our friends certainly raises the dignity of the class. Congratulations and success to Chet! We ordinary factory workers may have to appeal to these bankers later.

Here's another one: On the stationery of the Pilgrim Trust Company, Boston, Allen R. Greenleaf writes: "I am now with this new bank which opened for business on July 12, 1933. My associates were formerly officers of the Liberty Trust Company, which did a successful business for over 20 years. I should like very much to have you drop in some time and see if we can be of service to you." The Class doesn't get anything for advertising, but I strongly recommend anybody seeking a new banking connection in Boston to see Greenleaf.

The mills of this sad business depression do grind out many changes. Frank Parsons, whom everybody remembers as a good engineer with the Armstrong Cork Company, has left ten years' association with them to sell "Alfol" in the New England territory. This is sheet aluminum foil used for heat insulation in buildings. This is along similar lines that Frank handled in cork. It's an interesting product that has wide application. I recently saw Frank and enjoyed a pleasant talk with him about his new position and his new business. What shall we do next month to continue the good news of our

1915 Continued

column? There's only one answer: You chaps must write and let us all know where you are, how you are, and what you are doing. — AZEL W. MACK, *Secretary*, 72 Charles Street, Malden, Mass.

1916

Your Secretary is pleased to report that a very fine letter was received from Hovey Freeman as a result of his call for Class News last month. I wish that more classmates would follow Hovey's example. Hovey writes: "I notice your appeal for help regarding class news as expressed in the last copy of the Review. I therefore thought you might be interested in knowing that this week in New York I had the good fortune of seeing Tom Holden, who has a very fine position with the F. W. Dodge Company, and he told me that nowadays about 60% of his time is taken with committee work in connection with unemployment relief in its relation to the building industry."

"The same day at the Engineers Club I ran into Bill Farthing and another man who was a member of our Class whose name I cannot recall. Bill as usual is all agog about the real estate business in New York and tells me, in spite of everything that is being said about real estate, he really believes that things are looking better in New York. That certainly is a very hopeful sign. I also had the good fortune to run into my brother Jack and his wife, and Foss Purington '15 and his wife and we all went to inspect the hazards at the Paradise if you know what I mean. Believe me there is an Indian scene there that you ought to see. . . .

"We had hardly been seated more than about ten minutes and gotten through the first two preliminaries (you will remember that this was the night prohibition was repealed) when I heard behind me a loud laughing remark, 'Well, look who's here.' It was none other than George Kittredge. As both he and I were on the loose and as the others had theater tickets, I had to start over again so as to help George through his preliminaries and from then on it was a case until 2:30 in the morning of helping George celebrate a contract for something around \$4,000,000 for eliminating the grade crossings in Syracuse. Knowing the low price at which contracts are filled these days and also the prices that night clubs charge, I still think Kit did not quite spend all the anticipated profit by the time we parted. . . . Needless to say, Kittredge, who had just come on from Cleveland, was in his usual fine health and buoyant spirits."

"While the crowds on the streets, in cafés, speakeasies, and restaurants were tremendous, it certainly was a very well-behaved bunch; but I came away with the feeling that it is going to take the American public a long time to get educated up to wines and champagne, now that they have become so acquainted with bathtub gin and hard liquor. Back at the office I found Jim Evans had dropped in. I certainly regret not seeing him."

"While in New York I attended some of the meetings of the American Society of Mechanical Engineers and it is very

pleasing to see how at last people are beginning to appreciate the real dangers which lie ahead of us if various plans for inflation, deflation, or reflation are carried out. It has seemed to me very strange that it has taken the public so long to appreciate the dangers."

"The Technology Club of Rhode Island recently held a fine dinner in which the New Bedford and Fall River Clubs joined. I think it was one of the best meetings that has ever been held. At this meeting '16 had an excellent delegation. Among those present were the Stewart boys, Saul Makepeace, and Cy Guething who drove up from Westerly. Cy has not changed a bit and he looks as if he could still run the hundred in the same time that he did when he was in Tech. I would hate to have to run even half that distance in ten times the time."

Meade Bolton '16, who is an architect at Balboa Heights, in the Canal Zone, reports that at the present time he is very busy on a high school and junior college for Balboa, estimated to cost over a million dollars, and he has recently completed a \$725,000 high school for Cristobal. In addition to serving as President of the Technology Club of Panama, he has recently been appointed Honorary Secretary of the Canal Zone by Dr. Compton.

Jeff Gfroerer and his wife drove up to Boston for the Christmas holidays and called on your Secretary for a few minutes. Jeff is enjoying his work very much as manager for Dodge Automobiles in the New York District. He reports that business looks very rosy for next year. His office is located in the Chrysler Building. — HENRY B. SHEPARD, *Secretary*, 269 Highland Street, West Newton, Mass. CHARLES W. LOOMIS, *Assistant Secretary*, Bemis Bro. Bag Company, Memphis, Tenn.

1917

Neal E. Tourtellotte continues to advance in the flooring industry. The headquarters of the National Resilient Flooring Association, at Philadelphia, recently announced that he had been elected Vice-President and a member of the Board of Directors of the Association. The group represents about 21,000 resilient flooring dealers in the United States. Neal is also President of the Association's Northwest group, including dealers of Washington, Idaho, and Oregon. Incidentally, we find that as a sideline he is Washington State's representative of the American Distillers Corporation. Whether this is merely for the purpose of eliminating the middleman profit or not, we have not been officially notified.

Word has been received of the death in Waterbury of Frank C. Rogers, from injuries suffered at Fort Leavenworth, Kan., during the World War. — RAYMOND W. STEVENS, *Secretary*, 30 Charles River Road, Cambridge, Mass.

1918

Returning from a conference in Dr. Hunsaker's office on the afternoon of December 12, I found a note saying, "Don't go away until I see you. Jim Flint." Did that conjure up old and far-off

happy things! Presently Lord Jim came back with the news that after the Cherry Creek flood (see October class notes) the Jeffrey Company took over the Traylor Vibrator Company. So Jim is now in charge of the design of vibrating screens for the Jeffrey Company, with headquarters in Cincinnati, Ohio. That's news that ought to send little tingles along your spine, even if the sight of Jim's Pierce Arrow doesn't.

Gretchen, home for the holidays, telephoned us the other day. We asked her about local mistletoe conditions, but she would admit nothing.

Outside the snow is coming down with more vigor than grace. Traffic is almost at a standstill. The janitor has just leaned against the door to ask an opinion as to his chances of "getting home to East Boston tonight." But who cares? Yesterday was Christmas. One of the boys at our house decided he had best spend most of the day in bed as a result of certain indiscretions committed against a five-pound box of candy. Scientists claim that all things return to earth by and by. Yesterday the boy returned several. In the middle of the afternoon one of the older members of the family went up to the lad's room bearing several boxes of candy. "I've brought you some medicine," sez he. Game to the bitter end, the boy downed another chocolate. At the moment he's out of doors building a snow fort. Such is the unconquerable spirit of Technology 1943!

Beyond the window pane the day is dying, the snow is swirling around the lamp posts. But I am many miles and many years away thinking of a place and a day when a little girl, now almost grown up, said that Santa Claus must be a nice man because he had a voice just like her daddy's. — F. ALEXANDER MAGOUN, *Secretary*, Room 4-136, M. I. T., Cambridge, Mass. GRETCHEN A. PALMER, *Assistant Secretary*, The Thomas School, The Wilson Road, Rowayton, Conn.

1920

I have just received an interesting letter from Foster P. Doane of 16 Lincoln Avenue, Glens Falls, N. Y. Foster writes to advise of the marriage of Elliott R. Perkins, VI, to Edith Mary Richardson of Arlington, Mass. Foster acted as the best man at this wedding. He says that Elliott has been with the New England Telephone Company. After a honeymoon in Florida, the Perkinses plan to set up housekeeping at 33 Addison Street, Arlington. Foster has been in Glens Falls for three and a half years in the Research Division of the International Paper Company. He is married and Foster, 3rd, is now six years old. Foster reports having seen Donald Dowling, who is with the Connersville Blower Company. Foster says that Glens Falls is nice country and he extends a cordial invitation to any 1920 men to look him up if in that vicinity. We certainly appreciate hearing from him and hope he will write again.

It is with sorrow that I report the untimely death of Harold Lothrop Goodwin on December 4 at the Symmes-

1920 Continued

Arlington Hospital after an illness of only a week. Harold had been associated with the Edison Electric Illuminating Company of Boston for the past five years. The sympathy of the Class goes out to Mrs. Goodwin.

I hear interesting reports of the work of Benjamin West who is now living at 30 East Avenue, Valley Stream, N. Y. West has done a good deal of writing, including articles for the English technical publication *Engineering* and is particularly interested in the Tennessee Valley project.

Hank Caldwell's present address is 136 Liberty Street, N. Y. Eric Etherington is now in Utica, N. Y., address 15 Greenwood Circuit. Harold Murray has left Brocton and is with the Murray Stewart Motors Company, 326 Massachusetts Avenue, Cambridge. Phil Wait has moved to 181 Parker Street, Newton Centre.

Your Secretary wishes each and every one of you a Happy and Prosperous New Year. — HAROLD BUGBEE, *Secretary*, 7 Dartmouth Street, Winchester, Mass.

1921

They say that it pays to advertise, so we have appealed for news from our gentle readers. Then we decided the impassioned pleas for help were overdone, so we tried omitting them. Same result in both cases — no news! Looks like another hard winter with no letters to save us from total elimination from these columns.

As always at crucial moments, Professor C. E. Locke sends us a note, thereby averting what would have been a total eclipse of 1921 this month. Writes the patron saint of class secretaries (bless him): "Richard W. Smith has recently received the appointment of Acting State Geologist of Georgia." Congratulations, Dick.

Has everybody forgotten the undersigned? Where's that letter you have been intending to write? C'mon do it now! — RAYMOND A. ST. LAURENT, *Secretary*, Rogers Paper Manufacturing Company, South Manchester, Conn. CAROLE A. CLARKE, *Assistant Secretary*, 10 University Avenue, Chatham, N. J.

1923

For four or five years now, we haven't missed an issue of *The Review*. There has always been at least some crumb of news to pass along. This month the crumbs seem to have been all cleaned up.

There have been some address changes reported, but I haven't been able to elicit any information as to their whys and wherefores from those concerned. You will have to be content with the following recital of a few of the recent changes which appear to have some significance:

Art Belyea, X-A, from New York City to South Norwalk, Conn.; Jim Connor, X, from Akron, Ohio, to Cuyahoga Falls, Ohio; Fred Klutey, II, from Wilmington, Del., to Niagara Falls, N. Y.; Prof. Melvin C. Molstad, X, from Charleston, W. Va., to the Sterling

Chemistry Laboratory, Yale University, New Haven, Conn.; Joe Nowell, Jr., I, from Saulte Ste. Marie, Mich., to Chestnut Hill, Mass.; and Joseph K. Preston, X, who is with A. G. Spalding and Bros. in Australia, from Melbourne, to Sunshine, Victoria. — HORATIO L. BOND, *Secretary*, 195 Elm Street, Braintree, Mass., JAMES A. PENNYPACKER, *Assistant Secretary*, Room 661, Eleven Broadway, New York, N. Y.

1924

COURSE II

At the time of writing these notes it is in order to extend the season's greetings and at the time you read them, it will be time to ask you whether you have completed your personal arrangements for attending the ten-year reunion. The reunion will give those who are able to attend a means of satisfying their curiosity and interest as to the activities of our erstwhile close associates. To the remainder, our feeble efforts in these columns will have to be a substitute.

We are deeply indebted to five of our number for answering a stirring appeal for notes sent out by your Secretary. The first is from Roscoe E. Swift, who is with the Babcock and Wilcox Company as a member of its Refractories Department at 130 Cedar Street, New York City. An invitation is extended to any of us to call on him. The Swifts' daughter is now four and one-half years old. His letter contains items on several other members of the Class as follows: Perry Maynard is in the Long Lines Department of the Telephone Company; Ralph Johnson, who was with us the first two years, is in Rockford, Ill., but Swift was unable to get in touch with him on his last trip to that city. The last information on Eddie Proctor about two years ago was that he was with Bemis Bros. Bag Company in the South, trying to bag oranges. Swift reports further that he expects to attend the ten-year reunion.

E. D. Pollock is operating the Lincoln Theatre in Mount Vernon, Wash. He is married and has two children. Pollock, like many of the rest of us, has returned to the state he left to attend M. I. T.

Bill Walterskirchen is located in Missoula, Mont. He is connected with the Sullivan Valve and Engineering Company of Butte. They do all kinds of engineering work, and selling of heating, ventilating, and power plant materials. Bill was formerly connected with Engineering Service Company, of Des Moines, and the Kewanee Boiler Company, of Milwaukee. Bill is also a consulting engineer in the heating, ventilating, and power plant equipment field. Mr. and Mrs. Walterskirchen have four children, two boys and two girls, all of school age. Bill says that it will not be long before the boys will be entering Tech.

Harry Hammond outlines his efforts to garner the world's goods as consisting chiefly of performing the duties of Plant Engineer for The Dravo Construction Company in Sewickley, Penna., with an occasional ramble into the realm of chance by betting an odd nickel or two on his

ability to fill an inside straight but not with sufficient success to warrant giving up the former. Don't bring any extra aces to the reunion, Harry. Harry is married and has a small son. He was formerly with the Bucyrus-Erie Company, where he worked with George Anderson, who is still with them.

E. H. Hagen is still fighting tuberculosis and is winning to the extent that he is able to get around and follow his hobby of making motion pictures. I wish, in behalf of Irve, to ask any of you who may have available any interesting industrial movies in the 16 mm. size, that could possibly be loaned for a day or two, that you communicate with him at 323 North Drew Street, Appleton, Wis. These films will be well taken care of while in the possession of Irve and will be returned under full insurance coverage.

We have at hand the announcement of the marriage of Mr. Paul W. Keppler to Miss Marie Antonia Mueller on October 12, 1933, at Boston, Mass. They are now at home at 82 Lee Road, Scarsdale, N. Y.

Letters have been returned from Rolf S. Julsrud and Herbert H. Engemann. Many, in fact very many, letters were sent out by your Secretary and not returned, nor have answers been received. Don't drop out of the picture like Vice-Presidents after election. — FRED S. HUNGERFORD, *Secretary*, 208 Draper Avenue, Solvay, N. Y.

1925

Just in time to save us from a blank column this month came two letters from "foreign parts"; the first from Geoff Roberts in Johannesburg, South Africa, I give in part:

"Your letter struck a responsive chord in me, as I have always been interested in railroads. None of my relatives were railroad people, but in the course of my rather haphazard career, I spent two years with the Union Switch and Signal Company working on an installation of automatic train control on the Pennsylvania Railroad. As a youngster, I also worked 18 months for the Western Pacific Railroad on the coast as a chain-man and rod-man.

"In and about centers such as Johannesburg and Cape Town, signalling is three-indication color light. The equipment looks familiar, as it was all supplied by Westinghouse Switch and Saxby Signal. But on the long run from Cape Town to Johannesburg, all the signalling is hand operated. It seems to me that this department of the railroad could stand modernizing.

"I was surprised to learn that there are 200 miles of electrified line between Johannesburg and Durban. Metropolitan-Vickers supplied the locomotives. I believe they are 2,000- or 3,000-volt A.C. This route is quite mountainous. An additional 60 miles is now being electrified. I understand that the catenary supporting structures are made up of old rails welded together.

"There is one department in which the South African Railways do excel, and that is catering. They turn out the best

1925 Continued

meal I have ever eaten on any railroad at a very moderate figure, say three or four shillings, 75¢ or a dollar, for such a full-course *Table d'Hôte* dinner as you would only get at a first-class hotel. About the best place to dine in Johannesburg is Park Station, where for three shillings sixpence you get an excellent dinner served in faultless style. I might add that all the waiters are white, though sleeping car porters are colored as at home."

The second is from Abe Silverberg at Tampico, Mexico, and since the letter is brief I give it in full: "I am pleased to see the 1925 column become active again, and just to give you something to include in the column — whether anyone is interested or not — I shall give you a few details about my existence."

"After leaving Tech in 1925 I went to work for St. Louis Coke and Iron Corporation as Benzol plant and by-product plant foreman. In 1927 I went with the Pierce Oil Corporation at Sand Springs, Okla., and in 1929 was transferred to the Tampico, Mexico, plant of the Pierce Oil Company (Sinclair owned) and I am still here as chief chemist of the refinery. This is quite an interesting place to live. Plenty of fishing, hunting, and golf for 12 months of every year, and every once in a while something to break the routine — like our hurricanes of September 15 and 24 last, and a flood which followed made it necessary to navigate in the refinery by means of skiffs, row-boats, and motor-boats, and to ride through the streets of Tampico in the same fashion. The traffic jams were quite interesting." — HOLLIS F. WARE, *Acting Secretary*, 16 Smith Avenue, Reading, Mass. HENRY V. CUNNINGHAM, Jr., *Secretary*, Boston, Mass.

1926

In continuance of our doctoral procession, we give you John B. Wilbur, who received his Sc.D. from the Institute last June and is now, as he has been for several years, a member of the staff of the Department of Civil Engineering. Last summer, while working for Fay, Spofford and Thorndike, he made economic studies to determine the type of highway bridges to be built over the Cape Cod Canal. This fall he has been dashing back and forth between Technology, where he is teaching structural design, and the aforementioned engineering office, where he has continued his work on the Cape Cod bridges.

Tom Green, of Hartford, Conn., who, as he himself admits, will never be grouped among the epistolomaniacs, did actually communicate with your Secretary last month, inspired no doubt by the gently prompting spirit of the holiday season. He reported a trip to the Fair last summer with Eben Haskell no less. But let us embalm his own rare words in type: "We failed to see John Drum, who has left the Eastern Michigan Whatsit and is trying to find out why nobody loves the Pennsylvania Railroad. He lives in Chicago, but is out riding on the trains all week, and we couldn't make connections. . . . You may report me as saying that Haskell is practically ideal as a

traveling companion, except when faced with chicken à la king. Then he seems to go all to pieces. . . . I am looking forward to his taking me to the stratosphere next summer."

Perhaps the proposed penetration of the stratosphere derives from Eben's desire to get as far away as possible from chicken à la king. At any rate, it is good to pass along herewith to Eben's friends the intelligence that they should never place the delicacy before him, he being so punctiliously polite that he might consume it, be the aftermath what it may. We recall, too, having observed as a result of dining recently with this Anti-à-la-King, that he eschewed several varieties of soup. It would seem the part of wisdom for Eben to address to this column a communication setting forth his gastronomic inhibitions, or at least the principles which dictate his discrimination.

With a brevity that left much to be desired, F. P. Romanoff recently reported the birth of Sandra Frances Romanoff on October 5. — Letters dealing somewhat vicariously with editorial matters have passed recently between your Secretary and J. Y. Houghton, prolific Secretary of the Washington Society of the M.I.T. and a participant in the somewhat complicated activities of the Hydra-headed firm of Emery, Booth, Varney and Townsend. He has promised to make inquiries into the private lives of '26 men in Washington, and shortly to report on his researches in this column. — J. RHYNE KILLIAN, JR., *General Secretary*, Room 11-203, M. I. T., Cambridge, Mass.

1928

Foremost among the items of interest this month is the birth of Elizabeth Ann Hough, eldest child of Mr. and Mrs. Benjamin K. Hough. (Note: This is the same gentleman who was christened "Mahatma Gandhi" Hough at our fifth-year reunion.) Benny is an unusually proud papa. He can tell you about all of the child's dimples and interpret every little motion as having a meaning all its own. We are pleased to report that Mrs. Hough and young Elizabeth are both doing very well. Benny has said that the tribulations of becoming a father are really quite trying.

We have just received a note telling of the birth of Diana Cade to Mr. and Mrs. Harry F. Cade, Jr., and at this time we wish to extend our congratulations to this former Course IV-A classmate.

"Twenty-Eight men will be interested to know that John Shaw has recently applied for full membership in the American Institute of Mining and Metallurgical Engineers, and he gives his present position as that of superintendent at the South Burns Mine in Cripple Creek, Colo.

After leaving the Institute in 1928, John was a field operator with the Swedish-American Prospecting Corporation, doing electrical prospecting and computing results. Since 1929 he has been located at the Cripple Creek leasing, in charge of operations of the El Paso C. K. and N., Old Gold, Benny Adrey, and Bannon Gold Mines, all in Cripple Creek.

Chanced by Room 5-330 in the Naval Architecture Building one Friday night and whom should I find gracing its portals and holding the attention of some 80 men as he expounded the virtues and vices (mostly virtues, for obvious business reasons) of various types of refrigerators and refrigeration equipment, but none other than Johnny Praetz, Jr. He seemed quite at home on the platform as he rattled away on high in the lecture room wherein he once sat or slept through lectures himself. Johnny is giving a series of lectures, one each Friday night, covering the various phases of refrigeration installation and servicing work, the lecture series constituting the refrigeration course as put on by the University Extension Division of the Massachusetts Department of Education. Johnny said that if any of youse guys and youse gals know of a potent position that through an almost inconceivable condition, in view of the present economic state, happens to be open, to drop him a note and he'll call you pal for life. Johnny went out to the Chicago Fair this past summer with a stop-over at Niagara Falls, but says he's still looking for someone to plan with. Johnny is afraid the Falls will be dry by the time he gets out there with a better half. He says things at the Falls aren't what they used to be. Johnny Praetz bumped into Johnny Middleton, II, at the Fair and the latter Johnny had with him a fair maiden but not a wife. Middleton is now selling life insurance, and with success, in his home town.

Carl Bernhardt reports that he has a prospect for a good job in San Diego, and he expects to go there early in January if his "Jilloppie" will hold together long enough for the trip. Incidentally, Carl's remarks about Course II notes are being discussed with Joe Parks. More about that later.

Stew Newland sends an interesting letter from Happy Jack, La., care of the Freeport Sulphur Company. Stew says that he is delving into the oddities of constructing a sulphur-producing development in the midst of the southern Louisiana swamps. He says it is very interesting work, but rather lonesome, and mentions that he manages to week-end in New Orleans occasionally to break the monotony. "It's hard to imagine country exactly like this," Stew writes, "all swamps, not a tree in sight — the antithesis of New England."

We are pleased to report the engagement of Arioch W. Erickson, Jr., to Miss Louise F. Paine of Weston, Mass. No plans for the wedding have been made as yet. — The engagement of Richard T. Harrison and Miss Kathryn Prior of Shrewsbury, Mass., was also noted in a recent issue of the *Boston Transcript*. — The engagement of our old friend Fred Riley, Jr., of Lowell, Mass., to Miss Priscilla Fox of Norwell came as a very pleasant surprise.

The Boston Architectural Club recently had a showing of water colors, wash drawings in sepia, and several charcoal studies by Carney Goldberg of Course IV. Carney won the 1931 \$3,000 Rotch

1928 Continued

traveling scholarship for architectural study in Europe. He has just returned from two years of extensive travel through France, Italy, Sicily, Switzerland, Germany, Austria, Czechoslovakia, Holland, Belgium, England, and Spain. The exhibits at the Boston Architectural Club were composed entirely of subjects encountered on the trip.

The following interesting news article appeared in a recent issue of the *Boston Transcript*: "The New England Financial Service, with headquarters at 244 Washington Street, has been organized to furnish financial service to a large clientele all over the country. The new firm absorbed the Mellen Financial Service, which had been successfully operated by James H. Mellen, an associate of the late R. W. McNeel. The personnel of the New England Financial Service comprises men of long experience in financial matters.

"Louis J. O'Malley and Charles D. O'Malley, President and Treasurer, respectively, of the service, are sons of Charles O'Malley. Louis J. O'Malley is a graduate of the Massachusetts Institute of Technology, a trustee of the O'Malley Associates, and one of the commissioners of Massachusetts on public expenditures. For several years he has handled investments involving several million dollars."

Recently during a business trip through the mid-West, I had the pleasure of seeing Paul (Bus) Ruch and family, who live at 853 Harvard Street in Akron, Ohio. Bus has a young daughter, Shirley Ann, and a younger son, Paul, Jr., and he seems to be a very contented family man. He is in the operating division of the Goodyear Zeppelin Corporation, and says that he was almost sent to Florida this winter with the operating crew handling the Goodyear blimps. At the present time Bus is making a very thorough study of weather conditions as they relate to lighter-than-air craft. He is also the proud possessor of the relatively rare international balloonist license.

A little later on this same mid-Western trip, I happened to call at the Sears, Roebuck Company and while there asked for Bud Grey. One of Bud's former associates informed me that he had recently transferred to the Cutler Shoe Company, which runs a very fine chain of stores in Chicago. I was told that Bud was being taken in as a member of the firm. Later I called at one of the downtown stores to see him, but I was told that he would not be back until the following day.

Mr. William (Bill) Kirk objected to my recent description of him as a poker shark. He stated that he did not win because he was a shark, but rather because his opponents, Messrs. Parks, Jope, and Hough, were such terribly poor players.

After much pressure, Bill recently "threw a party" for the aforesaid gentlemen and several others who were out to get him. The sum of all losses amounted to about \$11. Bill's winnings totaled \$10.25. Draw your own conclusions. — GEORGE I. CHATFIELD, *General Secretary*, 420 Memorial Drive, Cambridge, Mass.

COURSE I

News in the past few weeks has been almost abundant but your Secretary has been lazy (we'll blame it on the Christmas holiday) and now these notes are being written with a hope that Ralph will be able to get them past the deadline for the February Review.

It is almost customary to begin with news of a wedding, and there is no exception this time. Miss Virginia Dexter and Bob Harbeck were married in Milwaukee on October 1, so to Bob and the new Mrs. Harbeck, our heartiest congratulations. Their address is 1333 South Avenue, La Crosse, Wis., and we're curious to learn whether this location means that Bob is working with the U. S. Engineers in that city. All of which reminds me that a year ago Jack Luby was in La Crosse with this organization. A Christmas card this year came from St. Paul, Minn. We'd be glad to know if Jack has changed jobs or has merely changed location.

Some of you may have seen Klegerman's article in the *Engineering News-Record* for October 12, 1933. Morey is an assistant engineer with Alexander Potter, 50 Church Street, New York City, and his article was entitled "Improving Concrete Quality by Paying Bonuses." His firm is consultant for a system of trunk sewers in northern New Jersey and many of the contracts for the work have included clauses to pay a bonus for concrete testing to a strength higher than the required minimum. Morey's article dealt at some length with the details and success of this system as used on this work.

From Weinberg and Rice I manage to get a first-hand account of the operation of the C. C. C. Rice is Project Superintendent with the U. S. Forest Service at Peru, Vt., and has been in complete charge of the engineering work of one or two camps since last May. His work has been mainly construction of roads and trails and dams to create small lakes in this section of the Green Mountains which he believes will become one of the recreational forests of New England. Rice was in New York for Christmas and I was able to see him for a few hours. — Weinberg is a First Lieutenant in the Reserve Corps on C. C. C. work and, as previously reported, spent the summer near Boise, Idaho. A recent letter gives his address until April 30 as Co. 277, C. C. C., St. Martinville, La. This letter, short and snappy, read, "Came here directly from Idaho. Have been here in the heart of the 'Cajun' country since October 19. This is the town made famous by Longfellow's poem 'Evangeline.' The people are entirely French: some Acadians, and others whose ancestors came directly from France. Really an historic locality and a picturesque town."

Here are a few excerpts from George Mangurian's latest epistle: "I have been going up to Boston every three weeks and usually see Bill Kirk and Joe Guertin. On the last visit also saw Tallman who is with the New Hampshire State Highway Department." Then George echoes a

sentiment noted by Chat in his notes recently, "My greatest ambition is to take over Bill Kirk in a poker game." As to his job, "Our experimental amphibian two-seater for the Navy is in its final stage of construction and should be flying within a month." George has kept very busy on wing and fuselage design for nearly five years now and must rank as our Course expert on such work.

I am indebted to Jope for the following: "Earl Crawford has been working for Fay, Spofford, and Thorndike on the design of Cape Cod Canal bridges. Herm Jones is back in Boston after having been in charge of some pottery kiln construction in West Virginia."

What follows may well be headed "Briefs." Bob Cook is employed in New York by a company specializing in waterproofing. Charlie Cristofalo is working in the Chevrolet plant in Tarrytown, N. Y., but commutes from his home in Pleasantville. Hal Porter, his wife, and I visited Hal Morrill and his wife recently at their apartment at 551 West 170th Street, New York City, and had a very pleasant evening. The Morrill's have two boys, Duncan and David, aged five and three. The former is our "Course Baby" and surprised me most by nonchalantly calling his father Harold. From Morrill, I learned that Terry Hurlbut is located in Maine, doing maintenance work on talking equipment in moving picture theaters. Herm Schwartz is doing time-study work in a factory in Newton, Mass., and wishing for a small farm to which he could retire to live a life of ease. Ed Ure is in the new Port Authority Building in New York. And finally, when last heard from, Vargas was getting ready to leave for Colombia for a job on highway construction. So be it. — GEORGE P. PALO, *Secretary*, 426 East 238th Street, New York, N. Y.

COURSE XIV

Harlan Paige must be given complete credit for reporting the present installment of Course XIV notes. It required six cents' worth of postage to mail them to me because they were so voluminous. I suggest a vote of thanks for Harlan's efforts and unflagging devotion to the end that Course XIV men might have news of each other. Harlan is the only member of the Course with whom I have been able to keep in continuous contact for the past five years.

Harlan writes as follows: "As for news, there's lots of it. I'm enclosing a couple of letters which you might return eventually (one from Chism and one from Joe Collins). Incidentally, Jimmie Mitchell allowed that he got married last summer. He is still making briquettes. George Swift and Johnnie Kolligian are the same as ever. Basilio has not been heard from recently. Jim Farnum sent me the clipping about Bialkowski. That just about covers the local front, I guess."

Chism's letter or "chronological history of my conduct," as he calls it, covers the period from the fall of 1929. Having relieved himself of business responsibilities, he decided to take things easy about

1928 Continued

June, 1931, and so he and his wife "settled down" in Seattle, Wash. June and July were spent camping in the Sierras of California. A baby arrived in the middle of March, 1932. June and July were spent on a yachting trip to the out-of-the-way places of Alaska. The Olympic games were witnessed in Los Angeles. A round trip across the continent was made in January and February of 1933. A 1,200-mile hunting and fishing trip to S. E. Alaska occupied May and June. Several short excursions were made to Vancouver, B. C., and places nearby. The Century of Progress Exposition was visited. And now Mid is probably within a short distance of New York City.

Joe Collins is still with Sprague Specialties Company of North Adams, Mass. Joe has discarded his leg braces and now wears only a reinforcing belt. — Harold Bialkowsky received his Ph.D. in paper chemistry last June. His doctor's thesis, "A Contribution to the Knowledge of Rosin Sizing," was read before the Technical Association of the Pulp and Paper Industry in October. Bial is now employed with the Gilbert Paper Company, Neenah, Wis. — CHARLES E. BERRY, *Secretary*, 409 West 22nd Street, Wilmington, Del.

1930

COURSE VI-A

I was fortunate enough to see Professor Wildes and Professor Timbie over Thanksgiving. I found them quite enthusiastic over our second course baby, donated by Charlie Flint. — I was told that Ernie Reisner had finally turned up and was living in Boston. I'm glad we've finally located you, Ernie. — Cillié still remains the Course mystery. Professor Timbie hazards the guess that he has gone back to South Africa. Page Stanley. — Prendy made an expedition to Philadelphia recently. He reports that Norm O'Shea is doing test engineering for R. C. A.-Victor. — A rumor has been transformed into fact. I have been receiving insistent rumors that George Theriault was married and this very night I received a Christmas card from the happy couple. I know the Course joins me in extending the best of good wishes. — E. D. Goodale is enjoying an enviable vacation from the R. C. A. plant in Harrison, N. J. I understand that he has off the two weeks including Christmas and New Year's day. — E. E. FERGUSON, *Secretary*, 60 Eaton Place, East Orange, N. J.

1932

Jack Kimble, VIII, is now with a private school in Washington, D. C., teaching physics, chemistry, algebra, and French, and he doesn't have much opportunity for his usual social activities. I was certainly glad to hear from him and hope that more of you will gladden the New Year with communications about your private affairs. Jack's address is the London School, 2131 Massachusetts Avenue, N. W. — CLARENCE M. CHASE, JR., *General Secretary*, Chase D33, Soldiers Field, Boston, Mass.

COURSE X

My fellow chemical engineers are either over modest or they are over worked, for I've not received a single letter from any of them and the only news chance has brought in came from Johnny Crowther, who sent it direct to Chippy. However, we need not go without news of each other for long, because I visited Tech professionally the week-end of the Harvard-Yale game and managed to extract what follows from Doc Lewis's files. Doc is busy as usual, Lombard Squires is his genial self, and Robby was receiving the perennial complaints of overwork from the Course X seniors.

Bob Semple is working for Monsanto in St. Louis, having married the attractive bit from the South he had at the senior dance. Bob got his M.S. last June. — Bill Hall was married Thanksgiving and is boosting the Atlantic Refining Company's stock in Philadelphia. Bill got his M.S. last June also. — Herb King is also at the Atlantic Refining Company. — Rolf Wallin became a master last June and went to work in October for the Carbide and Carbon Chemical Company in West Virginia. — Bill Walsh is located now at Warner Quinlan Company (oil). — Johnny Brown accepted an M.S. in June and is also with Warner Quinlan.

Johnny Crowther (himself) is working for Shell at Wood River, Ill. — Earl Anderton married Sally Brooks last summer and is working for Scott paper in Swarthmore, Pa. Tsk, Tsk! — Lee Burr is with his father in the Atlantic Chromium Company. He took on the ball and chain recently. — Bud Fraim is boosting the United Piece Dye Works at Paterson, N. J. — Jack Kelton is reported to be at Harvard Law. — Joe Fahey is in Cambridge with Dewey and Almy Chemical Company. — Al King is with his old love, the camera, at the Agfa-Ansco Company at Binghamton, N. Y. — Charlie McCormack is lending a hand at the O'Sullivan Heel plant in Virginia. — Dan Neilon is with Carter's Ink. — Bobby Parker is continuing his dramatic work (no doubt) and messing around the National Aniline Chemical Company at Buffalo as a sideline. — Jim Abbott is working for his father in Wilton, N. H. — Ed Poor is making paper for the W. C. Hamilton people in Philadelphia. — Tom Anderson is back with the southern gals at Baton Rouge. Standard Oil of Louisiana is his hobby. — Bob Billings is giving his all to du Pont in their Viscoid plant at Arlington, N. J.

Potts Chambers is with du Pont at Gibbstown, N. J. — Dubb Rash is with Lambert Pharmacal Company in St. Louis. — Bill Kirkpatrick is freezing up in Maine at the S. D. Warren (paper) Company. — Bill Holst must be in the Dutch East Indies by now with Standard of New Jersey, but no one has heard from him. — Nick Rothenthaler landed a job at the Great Lakes Steel Corporation at Milford, Mich. — George Connor got his M.S. in June, but I know not what he is doing at present. — Al Stockwell is in the textile game at the Arnold Print Works.

THE TECHNOLOGY REVIEW

That, my good fellows, constitutes the sum total of my information concerning us all. Kindly send corrections and additions to me at the following address. — W. A. KIRKPATRICK, *Secretary*, 35 Orchard Street, Portland, Maine.

1933

Well, Len Lindsay got his job and, as he promised us, when that happened, he also got married. The girl: Cornelia Lunt; the date: last September 30; the place: Boston; the job: with Bird and Sons, manufacturing paper. They are now living at 65 Cloverdale Road, Newton Highlands. That's the spirit, Len!

I received a line from Dick Fossett the other day, who is up at the Institute this year working for his master's. He says things are as dead as ever up there but gives a few pointers on some of the boys. Leighton Rickards is working with the Blackburn Coal Company in Albany, N. Y., driving an Austin now. I hope not delivering coal. Dick Morse, as we have previously heard, is studying at Munich and word has been received that he doesn't like the American girls he meets there. He only goes out with the Deutsche Fräuleins. He tells the American girls the equivalent of "No spikka da Inglesh." — Raff Faulkner, our Course III Secretary, has gone to South America as geologist for a copper company.

I received a very interesting letter from Bob Macy, XIII, as to what he is doing. Here is part of what he says: "I did not get a job in my own professional work directly after graduation, but took a summer job as passenger, freight, and information agent with the Canada Steamship Lines at Rochester, N. Y."

"However, during the course of the summer, a large naval construction program went through, and I had no trouble in landing a job with the New York Shipbuilding and Drydock Company, in the Hull Technical Department. I have a very fine job here, and enjoy it enormously, it being just the sort of job I had originally hoped to get. It is just a small department, only about a dozen of us. We do all the designing and technical work in connection with actual and proposed ships. . . ."

Let's have some more of you fellows join the "share the news" movement so that we can make this column long and interesting. — GEORGE HENNING, JR., *General Secretary*, 163 Barbey Street, Brooklyn, N. Y.

COURSE IV-A

I have received a letter from Lew Lewis, who is now located in Salem, Ore., where he is working for the Bridge Department of the Oregon State Highway Commission. The job came as a climax of a glorious summer vacation which started after graduation with a boat trip home via the Panama canal. Lew's present address is 210 N 14th Street. He sends his best regards to all the fellows.

From a round-about way information has come that Slick Henderson is still very much alive out in Missouri and that he had a very pleasant summer. As for his

1933 Continued

present activity, we can say nothing, as he has probably been so busy that he has been unable to find the time for a note or two.

After working with the Rochester Telephone Company for a few weeks, your correspondent obtained a position in the City Engineer's office, where he is now keeping himself out of mischief. — LOUIS H. FLANDERS, *Secretary*, 291 Rosedale Street, Rochester, N. Y.

COURSE VI AND VI-C

Beloved Sons of VI and VI-C, it takes me so long to get started, after addressing all ye children. Countless memories and retrospections come to mind of such devoted, faithful, and attached sons as Elmer Logan and Bobby McCormack. I need not divulge to our brethren the great amount of publicity Elmer has received in Chicago during the American Legion Convention. He was so popular that almost everyone was searching and combing the Loop in order that their hopes might be fulfilled and their passion satisfied. Oh, just one glimpse of Elmer is all I seek was the common expression of the "broads" of Loopinian rendezvous in Chicago.

By the order of the higher courts of the State of New York, an injunction has been issued restraining me from saying, divulging, or incriminating our other colleague or convict, Bobby (Elias) McCormack. I am frothing at the mouth with the intense desire of saying something enlightening to all concerned about Bobby (Elias), but I am duty bound. When the injunction is lifted, my suppressed feelings released and the froth comes to a foam, I shall explode with startling news of Bobby (Elias). Agent number VI is covering the case, VI-C will soon follow accompanied by a sanitary engineer. Have patience, sons of VI. You may send stamped and addressed envelopes to gain an early view of my personal opinion of the case. I hope in the next offering to The Review to feature Bobby Elias. I can't predict what the results may be, but I hope it's a complete exposure of this person Elias.

I am extremely fortunate and happy to have in my possession a letter from Elias, with absurd profundity that clearly substantiates what I have said above, and what I expect to say in the future of Elias Thunderbolt McCormack.

In a very manifold and deceptive way, he explains that he is under consideration for a position with Eastman Kodak Company. The company is searching every corner for evidence of his ability and character. At the present writing, I don't believe they have found any. His underground henchmen are destroying every bit of evidence that is pernicious to his character and ability.

Now we turn to the more human and pleasant associates and colleagues. C. E. Quick, who is always in a hurry to get somewhere, has finally gotten there. In fact, he got to two places. Charlie in his letter of November 22 stated he has a job with the Detroit Edison Company as a meter reader until things pick up a bit,

when he will be transferred to the Engineering Department. During his spare time and week-ends while at Tech, Charlie used to spend lots of time in Leominster with a lady friend to whom he is now engaged. To use Charlie's own words, "We aren't married yet and I don't know when we will be."

Next we come to Bill Barbour for information, and here is what he says. "As for myself — I am lucky enough to be employed by United Carr Fastener Corporation and was married last June to Miss Jane Eleanor Heap in Grand Haven, Mich." Bill has the honor and distinction of being the first one on my records to be married. May I send to you the salutations of your classmates at this time and my personal good wishes for a very successful future. Good luck, son.

Though I haven't heard directly from Bill Bray, I received interesting news from a crony of his, Charley Bryan, who is working here in New York City. Bill is connected with the Sylvania Tube Company and is apparently in the research department. Bill has also decided on breaking away from apron strings by being engaged to a nice girl I once had the pleasure of meeting. More power to you, Bill.

Bruce Ennis has spent the summer at his Dad's coffee plant building an automatic canary biscuit stamper and baker. Bruce had his car stolen while visiting Chicago. The complaint was filed at the nearest police station from which an alarm was broadcasted to all the squad cars. It was found a day later at about 2:00 A.M. in the morning in a dark alley, stripped of tools, windshield wiper, and tire covers.

John Clark has been trying to land a job in Yonkers, at which time he will give up the movie job he has had for a long time. Have asked him to get in touch with me when he settles in Yonkers, but no word from him as yet. John says he has had a great summer, lots of work, beer, and sunshine.

Al Payne in his letter of September 11 claims he has no job as yet, but has a pretty good lead that may materialize. If that has occurred, Cetterell Printing Company will be favored with his services. If any of the men are visiting Boston, be sure and come up to see him some time, his phone number is West Newton 0977W.

Bob Baker is an employee of the New England Box Company, makers of high-grade wooden boxes and crates. His work is closely allied to that of manual labor at the present time, but is making the President take notice of the work of an able engineer.

Dill Collins is dividing his efforts between two organizations, Public Service Company in New Jersey and Goodridge and Company in New York City. The NRA has helped him in obtaining the job with the Public Service. Dill is consulting engineer for my company which I will tell you more about later.

Dick Faldetta writes the following on a post card. "I am foreman, mechanic, checker on piece work, stock clerk, pay envelope maker-upper, personnel bureau

(fires girls) and a general — boy." His company manufactures automobile accessories and is located in Boston. Dick is also attending night school three times a week.

Charley Bryan lives in New York City and is working for the Ford Instrument Company, helping in the development of gun fire control as used by the U. S. A. It's very secretive work and he does not divulge his duties or those of the plant.

Joe Blanchard is with an insurance company in Boston and lives at 84 West Cottage Street, Dorchester, Mass.

Herb Endly is connected with the Postal Life Insurance Company, which is located about 500 feet from my office in New York City. Herb is studying to be an actuary and spends most of his evenings brown bagging.

You may be interested in knowing the status quo of your humble servant, Ed Goodridge. Since June, I have had three different jobs. They are: Metric Association, General Outdoor Advertising Company, Pioneer Lamp Company, respectively. At present I am in business for myself — Goodridge and Company — located at 489 Fifth Avenue, New York City. Our title is Sign Flashing and Signal Engineers. We design, install, and maintain sign-flashing equipment. The work is interesting and the future encouraging. We would like to obtain the services of one or two able salesmen; recommendations and applications are in order.

Two more "Round Robin Letters" will be started soon. We try to have groups no larger than 15 men contribute to one letter. This proves to be the most effective and efficient size group. When the letter reaches you, please do your small part, by contributing your sentiments, reactions, or what have you, that will be of interest to your classmates. God bless you, merry children. — E. S. GOODRIDGE, *Secretary*, 10 East 16th Street, New York, N. Y.

COURSE VI-A

The members of Course VI-A and the rest of the student body were shocked and saddened by the sudden death of Rupert Marden, on November 11. Rupert died of heart failure, brought on by exhaustion while climbing Mount Washington.

The list of fellows who may graduate in January has increased, and includes W. G. Webster, K. A. H. Smith, Max Millard, Harris Thompson, and myself. Mal Masters is on coöperative work with the Boston Edison Company, in the Electrical Engineering Office, under Tuck Arnold, VI-A, '29. Norman Levinson has been forging ahead in his work in Building 2, and has finished about all the requirements, except thesis, for his Ph.D. in mathematics. I understand that he is doing his thesis under Professor Wiener.

News is meager from Hugh Davis and Dick Zimpel, who are already out "seeking their fortunes." Hugh is working for the Grunow Company in Chicago and has been active in developing motors and transformers used in their refrigerators and radios. — JOHN F. LONGLEY, *Secretary*, M. I. T. Dormitories, Cambridge, Mass.

COURSE XVII

Come on you other Courses, get hot! Seventeen has the jump on you already. Six months after Commencement, lacking three days, we held the first reunion of the Class, and what's more, we had a 66% attendance.

The day, December 3; the place, the Kenmore; the event, dinner, and a bull-shooting lasting so late I had to ask Tom Galvin to rush off to catch the Owl; and it snowed for the occasion, too. Bob Crane made the arrangements, and he did a most capable job of it.

It seemed pretty good to get the old gang together, but we did miss Cotton, Neil, and Rowell. Professor Tucker wasn't there either — seems that his garden got him down during the Thanksgiving vacation and he hadn't recovered — but he was at the Institute during the afternoon as smiling and booming as ever. He's even more interested in housing now than he was last spring, and his two articles have aroused some real comment, I learned from Mr. Killian at The Review office.

For those who haven't been back to the Institute, I can report that it is still there. The juniors hold forth in our

places, but, of course, they can't fill them. Professor Voss is scheming a way to get the sophomores into the old materials display space, and he's giving the present seniors bigger and better problems and more frequent and "M" quizzes — there are no notes now. Maybe it's lucky we got out alive last year.

Willie Jackson is still on the job, but I didn't see "Henry." Wasn't there something said about his retiring at the end of the year? I dropped in on Professor Fife for a few minutes and we decided that even though I never used indeterminate structures it was good for me. Someone else is teaching the juniors this year. *The Tech*, my old love, cut its price to three cents and the "Lounger" carries on as before, though only twice a week.

As for our personnel, no one is married — yet. We got the first reunion, but guess some other course will claim the class baby. Tom Galvin is sure a lucky boy. He got fired — maybe "let go" is better — and within three days had a new job paying two dollars more a week. Hooray for the CWA! I tried to call Neil on the way South, but he was out at the time and I was unable to call later. Ed Rowell is still in Philly and hoping. Cotton, as previously reported, is in Missouri. Drop

him a line care of the Cotton Lumber Company at Columbia and get a reply on that swell stationery he uses.

Jim Norcross had to cut law school, but came to the dinner anyway. He's steeped in real estate now and suggests something about building management for the department. Sully is still figuring for anyone who wants service; Bob Crane continues to run brick tests at school and peddles ornamental bronze on the side. The Colonel keeps his hopes up and paints occasionally.

We'll have to try this dinner stunt again, but goodness only knows when the economic situation will break so I can get to Boston again. In the meantime, I wonder why some other Course doesn't try it. Seventeen would even consent to come as honor guests — just ask us.

By the way, I wonder just who I am. Recent letters tell me my middle initial is "C," "M," and "W" — try again, boys. And I have a new address, too, while building nine double houses for the U. S. at Fort Monroe, the Coast Artillery's summer home for Tech R.O.T.C. students. It must always end, so — "Drop me a line, sometime, anytime." — BEAUMERT WHITTON, *Secretary*, Box 173, Hampton, Va.

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February 17, 1934

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